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INCISOR AND PROFILE—A STUDY IN COMPARATIVE ANATOMY.

BY C. L. GODDARD, A.M., D.D.S., SAN FRANCISCO. READ BEFORE THE NATIONAL DENTAL ASSOCIATION, AT MILWAUKEE, AUG. 6-9, 1901.

Let us turn our attention from defective teeth and their treatment, from cavities of decay, filling materials, bacteria, etc., and study for a short time the teeth of animals and see if we can learn from them anything relating to human teeth. As our time would be altogether too short for a study of all the teeth of all the animals, I will call your attention only to the teeth of mammals, and to their incisors only, their forms, uses and changes in the development. I shall not try to show all the consecutive changes, but only living examples of some of the changes that have taken place in the billions of years since mammals were developed.

The earliest teeth were simple cones, and we find an example in those of the dolphin (*Delphinus Dolphis*; order cetacea), a homodont mammal, whose teeth are all of the same size, with no division into incisors, cuspids, premolars and molars. The teeth are used only as organs of prehension.

Similar teeth for the same use are found in the sea-lion (*Otaria Leonia*); all are sharp ones. The six anterior teeth we can call incisors from their position only. The cuspids show plainly from their size, and the premolars and molars are of the same form. All are cones of dentin covered with enamel, but the premolars and molars each show one small budding cusp.

In the seal (*Phocagrenandia*) also we name the six anterior teeth incisors from their position alone. They are simple cones, situated between the larger cuspids. The premolars and molars show four or five cones in a single line, and serve for cutting. Although the two animals are cases of reversion from a higher and more complex type, their teeth are good examples of what has taken place in development of animals now extinct.

The total absence of incisors is shown in the Edentata, of which the armadillo (*Dasypus*) is an example. A long, slender tongue serves to draw leaves and young shoots into the mouth and renders incisors unnecessary.



Beaver.

Fig. 1.

Wombat.

The dog (*Canis Familiaris*) serves best to illustrate the Heterodonts—the division of teeth into incisors, cuspids, premolars and molars. In almost all other mammals also we find the true incisors, that is, the cone flattened into a chisel-shaped or cutting tooth. As is well known, the dog lacks but one of having the typical formula, having $I\ 3/3\ C\ 1/1\ P\ 4/4\ M\ 2/3$ equals 20/22. The incisors are small, short, and meet edge to edge, and are not of nearly so much use as the incisors of other animals.



Fig. 2.—Squirrel. Elongated lower incisors.

The most perfect incisor is possessed by the rodents, of which the beaver (*Castor Canadensis*), (Fig. 1) is a familiar example. The labial surface only is covered with enamel, of orange color, and the dentin varies in hardness from the enamel to the lingual surface,

so that as the tooth is worn away it always preserves a sharp edge of enamel, shoved up by the softer dentin. To provide against this wear the tooth grows from a persistent pulp. In the skull from which this cut was made the external alveolar plate was cut away



Fig. 3.—Left upper incisor, corkscrew shape. Right upper incisor penetrating nasal cavity.

to show the great length of the root so firmly fixed in the alveolus to withstand the severe use demanded of it. You will see that it extends back of the posterior molar.



Fig. 4.—Comparative view of squirrels' skulls, showing lower protrusion as cause of irregularity.

The other figure on this cut shows the teeth of the wombat (*Phascolomys Ursinus*) of Australia, where all the native animals, marsupials (*Didelphia*), of the lower stage of development]mimic the different orders of the *Eutheria* (*Monodelphia*), which comprise

all the animals of the rest of the world with one exception, the opossum. We find herbivora, carnivora and rodentia. It is interesting to compare the teeth of these two animals of such widely different origin. All the teeth of each are of persistent growth; both have the antero-posterior movement of the lower jaw to enable the cutting edges of the incisors, two in number in each jaw, to work against each other. The enamel of the teeth of the wombat is covered with cementum, and the incisor root extends back of the second molar.

When an incisor of a rodent is broken its antagonist continues to grow throughout the life of the animal. If from any cause the incisors fail to meet and wear each other away, the continuous growth results in an enormous development. This is well shown in the next cut (Fig. 2) of a squirrel (*Sciurus*). The lower incisors extend above the upper level of the skull. The left upper has grown out laterally, coiled like a corkscrew and made almost two complete turns. The right upper incisor, making a complete turn, has penetrated (Fig. 3) the hard palate and formed nearly half a circle within the nasal cavity. By comparing the skull with a normal one (Fig. 4) you will see that the cause of this irregularity was lower protrusion; the lower incisors extending forward of the upper, so that they could not meet and wear each other.

One family of rodents, the hares and rabbits (*Leporidae*), have a pair of small functionless incisors behind the upper centrals.

The elephant is another familiar example of the persistent growth of the incisor, there being but two in the upper jaw. Many think their tusks are cuspids, but the fact that they develop in the intermaxillary bone shows they are incisors. The open end of the root is very near the surface of the forehead. Tomes gives an illustration of a spear-head imbedded in a tusk. He explains that it must have penetrated the skull from above and entered the open pulp-cavity. President Jordan of Stanford University humorously suggested that the elephant was a rodent whose incisors had failed to wear away.

In another fossil animal, the dinotherium, we find a curious diversion of the lower incisors. The anterior part of the lower maxilla is deflected downwards so that the incisors grow in that direction.

The fossil mastodon (*Mastodon Americanus*), according to Tomes, had besides the upper tusks two lower incisors that "grew out hori-

zontally from the front of the jaw." In some species these were rudimentary, were lost early or were altogether absent.

The incisors of the horse (*Equus Caballus*) present an anomaly

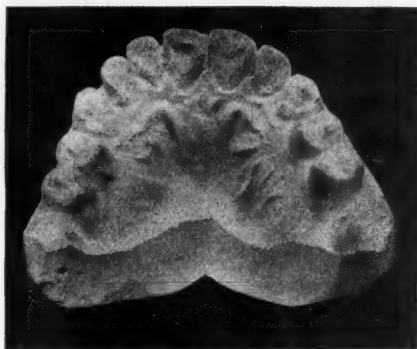


Fig. 5.—Five incisors.

not seen in any other animal. The enamel of the cutting edge dips in, is invaginated as the end of the finger of a glove may be pushed in, leaving a cup of considerable depth. As the upper and lower



Fig. 6.—Six upper incisors.

incisors meet edge to edge, the ends wear away till the cup disappears. The varying degree of wear enables a good horseman to tell the age of the animal. In the early five-toed horse this cup does not appear, and but slightly in the three-toed. The horse is a graz-

ing animal, yet its incisors vary a great deal from those of the ruminants, of which the cow (*Bostaurus*) is an example. The lower incisors, six in number, have a somewhat fan-shaped crown with a not very long root. The fourth tooth from the median line is of the same shape and size as the incisors, but classed arbitrarily as a cuspid because the entheria never have more than three incisors. As you well know, the ruminants have no upper incisors, but a thickened pad of gum tissue against which the lower incisors close, enabling the animals to grasp the blades of grass or leaves and tear them off by a jerk of the head. The incisors of the ruminants are thus organs of prehension rather than cutting instruments.

Among cetaceans the narwhal (*Monodon Monareros*) presents an anomaly. It has but two incisors, both upper, one rudimentary, but the other projecting forward out of the snout from ten to twelve feet, and from three to four inches in diameter at the base. The tusk is quite straight but is marked by spiral grooves, "winding from right to left" (*Tomes Dental Anatomy*.) *Tomes* says that rudiments of a second pair of incisors have been found in a fetal narwhal, but never in an adult.

The incisor of the galeopithecus (the flying lemur) is extremely curious. The lobes on the cutting edge, such as are noticed in the human incisor, are prolonged to such an extent that the divisions extend almost the whole length of the crown. The tooth looks like a comb, and some naturalists insist that the animal uses it as such.

Of the marsupials, the kangaroo (*Helmaturius*) shows a curious and interesting arrangement of the incisors. There are six upper and two lower ones. The six upper are arranged in parabolic curve, the third incisor being as wide as both the others. The two lower incisors project forward in a horizontal line, as if to prolong the lower jaw, which is relatively short. The crowns are long, straight and flat on their mesial surfaces, so that they fit inside the lingual surfaces of the upper as one jaw of a plate-cutter fits inside the other. They have no deciduous predecessors.

The domestic hog (*Sus Domestica*) has three incisors on either side of each jaw, diminishing in size from first to third; the lowers are quite procumbent. There is a diastema between the upper second and third incisors. This is the only existing animal that has the typical number of teeth, forty-four.

The lemur, next lower than the monkey, has the upper incisors more nearly resembling the human, but the lower are very slender, quite procumbent, and vary in number from three to one. I show here a jaw in which the lower cuspid has the shape of an incisor, while the first premolar has taken the form of a cuspid.

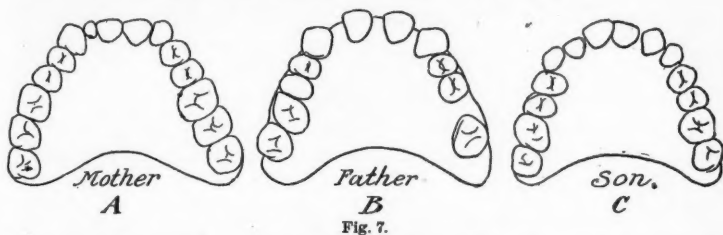


Fig. 7.

One point I wish particularly to bring out in this review is, that in placental mammals the normal number of incisors is three on either side of each jaw, and that while a few orders have less none have more than that number. In marsupials the number varies from one in the wombat to five in the opossum.



New World Monkey.

Fig. 8.

Old World Monkey.

Leaving now all mammals excepting the quadrumana, we find the dental formula of all the old world monkeys (Catarrhine), to be the same as that of man, viz.: I. 2/2, C. 1/1, P. 2/2, M. 3/3. The general shape of the incisor is the same as that of a man, but in the gorilla and the orang outang much larger and heavier. While in most animals the incisors meet with an edge to edge bite,

the upper incisors of the quadrumana and of man close over the lower, so that they pass by each other in the lateral movements of the jaws in mastication. In monkeys the incisors are arranged in the arc of a larger circle than in man; and the premolars and molars are in nearly parallel rows. See the jaws of the gorilla, although the marmoset shows the Bonwill triangle. This little monkey has a larger brain case than any other in proportion to its size, and is the only one that has no third molar.

In man there are occasional reversions to the lower types, more often in the number of incisors than of other teeth. We sometimes find five incisors and occasionally six. These supernumerary teeth may be of normal shape and in regular alignment (Fig. 5), or may be reversions to the primitive cone. Generally the attempt of five or six teeth to arrange themselves in the space provided for four results in a simple irregularity, the supernumeraries being crowded out of the arch. Sometimes the result is a constitutional irregularity; the alveolar process building itself up around the five or six teeth arranged in a more prominent arch. Fig. 6 shows a case of upper protrusion due wholly to the presence of six incisors. What was the remedy? Simply that of nature, the suppression (extraction) of the third incisors and pressure on the rest to reduce the size of the arch.

In our higher civilization nature in many cases is continuing her work of suppressing incisors. Sometimes the lateral reverts to the form of a simple cone, but is so frequently absent altogether that we have become accustomed to speak of it as the missing lateral. Sometimes this is hereditary. Fig 7 (A, B and C), shows three members in one family—the mother with but one lateral incisor, the father with none, and the son with but one.

The size and number of posterior teeth have an influence on the position of prominence of the incisors that is not always noticed except by those interested in orthodontia.

Fig. 8 shows the profiles of two monkeys of about the same size, one of the new world (Platyrrhine) and one of the old (Catarrhine). The first is the more prognathous, that is, the incisors, both upper and lower, are much more prominent than those of the other; but what is the difference? While the normal number of premolars in placental mammalia is four, the monkeys of the American continent have three, while all the others have but two. Nature has reduced

the prominence of the incisors by reducing the number of premolars.

In the practice of orthodontia we do the same thing. Fig. 9 (A) shows the teeth of a girl of seventeen. The incisors, both upper



B.

Fig. 9.

A.

and lower, are very prominent, a case of double protrusion. The teeth are too large for the jaws, which are of less than normal size. The first bicuspid (premolar) was removed from either side of each jaw, and the anterior teeth forced back as shown in the second cast,



A.

Fig. 10.

B.

Fig. 9 (B). Fig. 10 (A and B) shows the effect on the profile of face, and the reduction of protrusion of the upper and lower incisors.

While studying the human profile let us examine two cuts given as standards. Fig. 11, from Kingsley's "Oral Deformities," shows

a profile given as the artist's standard. Fig. 12, from a recent textbook on Orthodontia, shows the profile of Apollo, recognized by all artists as the type of manly beauty. To the eye the two look quite different. The chin of the second seems too prominent, and that of the first not prominent enough. In the second a vertical line touching the most prominent portion of the forehead and chin cuts off half the nose. In the other the vertical line does not touch the chin. To study their relation to each other, I went to the Mark Hopkins Art Institute, a department of the University of California, and made photographs of a plaster cast of Apollo Belvidere,



Fig. 11. (Kingsley.)

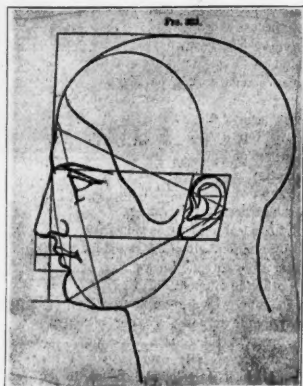


Fig. 12. (Angle.)

the marble original of which is in the Vatican, and of which all modern pictures or statutes of Apollo are supposed to be copies.

On one photograph I drew lines like those on the profile from Kingsley's book (Fig. 13). A horizontal line was extended from the lowest point of the lobe of the ear to the lowest point of the nose. Its position in regard to the chin is about the same as Kingsley's. On a duplicate photograph I drew a line from the forehead to the chin (Fig. 14), and found to my surprise that it cut off two-thirds of the nose instead of one-half. A vertical line from the most prominent part of the forehead, bisecting the nose, will not touch the chin. I found the discrepancy between the two apparent rather than real, and due to a difference in the vertical

line, or really to a difference in the inclination of the head. I learned one important thing, however, from this comparison, which is, that the published profile of Apollo, showing the nose bisected by a line from the forehead to chin, is wrong, either the chin is too prominent or the nose not prominent enough.

Since writing this paper I have had an opportunity to examine at Beloit College, Wisconsin, the plaster casts exhibited by the Greek



Fig. 18.

Government at the World's Fair in 1893. These casts are all reproductions of classical marble statues, and among them all I did not find one in which the nose was bisected by a line from forehead to chin. In all of them two-thirds of the nose projected beyond such a line. Among them was a statue of Hermes (Mercury) bearing the infant Dionysus (Bacchus), made by Praxiteles in the 4th century B. C.

In studying the profiles of our patients we must bear in mind the

vertical line that, touching the forehead and chin, cuts off two-thirds of the nose. If it bisects the nose the chin is too prominent or the nose not prominent enough. If a vertical line from forehead to chin leaves more than two-thirds of the nose beyond it, either the chin is not prominent enough or the nose is too prominent. We must study the head at different inclinations to determine this.

In orthodontia we must study the contour of the lips in relation



Fig. 14.

to this line. A case of upper protrusion may be apparent rather than real, due to a short chin. If the prominence of the upper lip is reduced by pushing back the upper incisors it will leave the nose too prominent. Such a case may sometimes be greatly improved by moving forward the lower incisors and then pushing forward the lower lip only. In some cases the profile can be improved only by "jumping the bite" and moving the chin forward.

To recapitulate, our study of incisors in comparative odontology

has shown that in animals the number and uses vary, but that three is the typical number, which in the quadruma is reduced to two; that in man there is occasionally a reversion to three, but more often a reduction to one; that upper protrusion may be due to a reversion to a more primitive type, and that the protrusion may be reduced by lessening the number of incisors; that in some monkeys nature has reduced a prominence of the incisors by reducing the number of premolars from three to two, and that in orthodontia we produce the same result in man by reducing the number of premolars from two to one; that in the normal profile of the human face a line from forehead to chin cuts off two-thirds of the nose; that the position or inclination of the head must be studied to determine whether a faulty profile is due to prominent chin and deficient nose or prominent nose and deficient chin, and that our treatment must be in accordance therewith.

Discussion. *Dr. A. O. Hunt*, Chicago: Whatever expression there is in the human face is confined mostly to the lower fourth of it. In criticising the facial angles as represented by the cast of the Apollo Belvidere many things must be borne in mind. This is a classical face—an ideal condition that has been reached not by finding same in any one individual, but like the ideal form of the human body, it is a composite of all the best types and proportions of many individuals. This is from the standpoint of the artist. In all these figures and faces, both in sculpture and painting, the work at that time was wholly ideal, it was some time later that artists began to work from the actual human form. The study of these ideal forms, except to take them as standards by which we may work in restoring the expression and shape of the human face, is of no special value to us in its application to dentistry. In fact, the classical ideas, forms and proportions are very misleading, because we at no time deal with a human face which is classical in its proportions and outlines. We are constantly meeting faces that show only variation from the artist's idea, and instead of studying ideal conditions our purpose should be to harmonize each individual face by itself. We must always remember that the question is not one of constancy, but of continual difference in every characteristic. From the artist's standpoint the human face is divided into four equal parts lengthwise, but as we usually see it these parts do not harmonize, and the lower fourth of the face may be longer than the

middle or second portion. The best type and condition, that which indicates the highest intellectuality and the most perfect development, is where the angle of the face is one of ninety degrees, that is, taking the base line as shown across the pictures here exhibited, when the prominent parts of the face will follow this angle when set in it. How often do we find this condition? Dr. Kingsley's illustration was entirely from the standpoint of the artist. The variation in the position of the teeth which constantly occurs causes a variation in the profile of the face, because the teeth bear a definite relation to the lips and face. When the nose is lacking in prominence we cannot change it, but we can alter the lower fourth of the face when necessary, and in so doing our effort should be to adapt all parts, so that the profile of the face shall show a harmonious whole.

Dr. C. N. Pearce, Philadelphia: Dr. Goddard's illustrations are most remarkable. Although I have been a student of comparative dental anatomy for many years, I never saw the crania of the various animals brought out so beautifully as he has done it. The question that we must ask ourselves is, what has produced this great variety of forms? Is there some mechanical force which has influenced them, giving to one a certain tooth and to another quite a different shape? I assume that they are all subject to mechanical influences, and when we consider the domestic animals and the modifications that have taken place in them, we are certainly justified in believing that it is simply the food which gives the force and is the factor fixing the shape of the jaw and of the teeth. The nine-banded armadillo has a tooth without any enamel, which is simply degenerated from teeth with firm enamel on the surface, and their condition shows that the modification of the food habit has produced this result. Our domestic horse has also lost a tooth from either side of each jaw, now having but forty instead of forty-four. Whenever there is an increase in the size of the brain case we find a lessening of the length of the lower jaw and a crowding out of the teeth.

Dr. W. E. Walker, Pass Christian, Miss.: I would call attention to two errors, one in the paper and the other in the discussion. We were referred to the illustration of the Apollo Belvidere in Angle's work on malocclusion, and it was stated that the line was drawn so as to bisect the nose. I obtained that impression when first reading the book, but seeing that it did not apply in practice I reread the

article and found that I was mistaken, just as the author of the paper is. Dr. Angle states that the line bisects the alae of the nose, but not the nose itself, which leaves out of consideration its anterior third.

Dr. Hunt stated that we could modify only the lower fourth of the face, which certainly is not correct. This would ignore the greater part of Dr. Case's work. His models are casts of plaster poured into plaster impressions of the face, and no one would think that he has artificially made them by building up. An examination would remove any doubt in this matter. In these casts we see that the nose is modified, yet it cannot be considered in the lower fourth of the face.

Dr. Goddard, closing discussion: When anything is represented by a picture we refer to the drawing more than to the words of description, and I still think the expression "to bisect the alae of the nose" would mean bisecting the nose, taking the alae in that case to mean the whole width of the nose as we see it in profile. The drawings and photographs of patients published as standards certainly bear out that view. In regard to the simple harmonizing of the features in our work, how can we know that they are harmonized unless we have in our minds some standard? These classical profiles are our standard, and we cannot expect to reproduce them, but having the ideal in our minds, to harmonize the features, as Dr. Hunt says.

STERILIZATION OF INSTRUMENTS.

BY G. GOODE, D.D.S., ROCHESTER, N. Y. READ BEFORE THE ROCHESTER DENTAL SOCIETY, JAN. 8, 1901.

In order to decide on the practical means of sterilizing dental instruments it is first necessary to consider the general processes of sterilization, which are found to be by medicaments and by dry and moist heat. The experiments of Prof. Miller and others with medicaments alone seem to prove that none is entirely satisfactory, and that an ideal disinfectant, one that acts immediately on bacteria without injury to instruments, has not yet been found. Those proving most efficacious were carbolic acid, lysol, mercury bichlorid, all in five per cent solutions, and peroxid of hydrogen in ten per cent solution. Sterilization by moist heat possesses many advantages that appeal to the busy man, and boiling instruments in water

containing a small amount of soda to prevent rust undoubtedly assures a great degree of cleanliness and a condition closely if not quite approaching asepsis.

The use of formaldehyd gas is without question the most efficient means of producing the desired effect that we now possess. In a report on the use of formaldehyd for disinfecting instruments Dr. Horton of Philadelphia drew the conclusion that "Sterilization could be effected without injury in a closed space of less than one cubic foot to the formaldehyd gas generated from a pastil containing five grains of paraform." From the experiments made by Dr. Low of Buffalo it is readily seen that perfect asepsis is difficult of attainment. He showed that every set of instruments, except in cases where the whole cabinet was disinfected over night, produced some cultures, but not one set developed a culture of pathogenic organisms. While the boiling of instruments may seem to be the most feasible means of sterilization, and the use of formaldehyd gas a needless expenditure of time, it nevertheless seems to me that the latter method is far more practical and should be generally used.

All must agree that our scalers, forceps, lancets, clamps, etc., should be aseptic, and the formaldehyd gas bath will be found to be the surest, cleanest, simplest and most scientific means of producing this effect. In scaling operations the points of the instruments should be kept in an antiseptic solution so as to prevent contamination from contact with the table. Although the ordinary methods of sterilization employed in surgery are impossible in dentistry, every dentist is nevertheless morally bound to follow the rules of asepsis so closely as the demands of a daily practice will admit.

Discussion. *Dr. F. W. Proseus:* I have a Low sterilizer and it is a cumbersome and awkward thing to handle, especially when one is in a hurry. There is much room for improvement in it. The asbestos with which it is lined becomes thoroughly wet at times, and I would suggest an air vent, so that when the lamp is lighted and the moisture has passed from the instruments, we should have a dry chamber. The cover of the instrument is simply a piece of poorly pressed metal with the corners turned, and not being level it wobbles. It stands on four legs screwed into the lower frame, and these legs work loose. They also bring the chamber too high and it is apt to topple over. The lamp is too high. When once it is lighted there is little trouble in sterilizing instruments, but if the apparatus

is near your chair or even in the operating-room it gives off an odor which permeates the whole office and annoys both patients and operator, and I would suggest a hood to carry off the superfluous gas to the outside.

Dr. C. F. Bunbury: I always use a ten per cent solution of lysol for the sterilization of instruments, leaving them in it for a time and then scrubbing them thoroughly with a brush. In pyorrhea cases I am especially careful, and after I have cleaned one tooth I sterilize that instrument, never using it upon another tooth until I have dipped it into a three per cent solution of pyrozone.

Dr. P. H. Smith: I scour burs, excavators and other cutting instruments, using boiling water and alcohol, and after a bath in the latter I put them through the flame. Particular attention is given to the mouth mirror.

Dr. B. S. Hert: So far as I know I have never had trouble from infected instruments. Great injury might result from instruments not thoroughly cleansed, but apparently it seldom does. The aseptic rubber-dam is a great aid, and if it were used oftener in operating it would assist materially in shutting off even the probability of infection. I always boil my instruments between treatments, using a little soda to prevent rust. According to Dr. Low, fifteen minutes are required to render instruments perfectly aseptic in his apparatus.

Dr. L. S. Goble: The germs which we consider the most deadly die the easiest. Syphilitic germs are the ones we seem to be most afraid of, yet if I am correctly informed they die within twelve hours of removal from their habitat. Many bacteria, like their products, are very soluble and easily removed by running water. The cases of poisoning from dental operations are so few that the danger might be considered next to nothing. The saliva is antiseptic and a most efficient ally. When we consider the finger-nails, the roughness of the hands, and the mucous membrane, we must admit that the ordinary wash has about as much effect as castor oil on a graven image. A man recently said before the National Dental Association, "The ordinary germ has about as much chance of doing harm as a mouse in a glass bottle." One must be in the right condition to favor the growth of these germs. Some people seem to be immune, while others contract blood-poisoning from the scratch of a pin. We cannot be too careful, and I never put an instrument that

is not perfectly clean into the mouth, yet we should not lie awake nights thinking of the people we may poison.

Dr. W. W. Belcher: I use boiling water and soap, and find them sufficient if other little details are looked after. I think it a good plan to have instruments laid on a glass before placing them in the cabinet.

ETIOLOGY OF DISEASE.

BY C. L. HUNGERFORD, D.D.S., KANSAS CITY, MO. READ BEFORE THE NATIONAL DENTAL ASSOCIATION, AT MILWAUKEE, AUG. 6-9, 1901.

It is one of the curious contradictions of human nature that all should shrink from physical suffering and put forth every effort to make it cease, and yet so assiduously, though perhaps with unrecognized intent, keep alive its moral equivalents—mental disquietude, selfishness and sorrow. It is self evident that if this world was once a sterile, incandescent globe what we now know as disease was entirely absent, and the purport of this paper will be an attempt to show that the physical body of man, evolving on parallel lines with his mentality, grows naturally and harmoniously, as the mind lends itself to the purposes of its incarnation or begets disharmony and disease, as the mind yields to the promptings of its molecular structure whose habits have been established in other kingdoms from whence they came into his body, and over which his mind now fails to exercise a control.

It is well recognized that an act performed by any set of cells will have a tendency to be repeated under analogous conditions. This is the basis upon which habits are formed, whether they be good or bad ones. As our bodies are composed of elements taken from the so-called lower kingdoms of nature, having come into our economy they naturally tend to reproduce the acts with which they are familiar, thus in varying degrees swaying the mind to yield to those bodily sensations which the molecules themselves have found to be agreeable. The mind, having thus yielded to the promptings of the body, also tends to repeat itself, until an act at first painful eventually becomes agreeable and we have established a habit, or a physiological process if the habit is sufficiently prolonged.

Now, as all nature makes for evolution progress is possible only when life flows as a constant, steady stream through an unresisting vehicle. Then growth is painless and joyous, but if any impedi-

ment or cross-current is placed in the way by desires begotten of habits then disease becomes a factor and pain is the result; for all habits are contrary to the laws of evolution, habit being simply the repetition of an old act. The healthy man needs no tonics; his pulse leaps without their aid; but humanity is not happy; it needs the stimulus of pleasure or pain to make it feel alive, and it never will be either healthy or happy so long as it habitually yields to any habit whether of pleasure or pain.

All sensation commences with pain and all finally terminates in pleasure; but we must remember that pleasure ends in satiety or monotony, which is the most drastic form of pain known to humanity, and the latter end of that condition is worse than the first. The first is nature's warning that something is wrong, so the wise physician does not too soon give something to allay pain, but first endeavors to find the cause. The absence of pain in the case of any known lesion is a symptom of alarming gravity, for a body incapable of responding to pain is very near death. So, also, pleasurable sensation means simply the molecular response of acts that have become habitual and for the time being agreeable to the molecules; but if the habit is stronger than the informing principle which should govern it the result is satiety, disgust and disease.

Volumes could be filled in the elaboration of this idea, but what we wish to find out is, how did the molecules or cells first come into the acquirement of a habit. The time never was when matter did not exist, nor will the latter ever hereafter cease to be. Substance is as eternal as spirit and must have forever carried its impress, whether for good or ill, for spirit and substance are but the opposite sides of the absolute *all*. The molecules of the universe, then, were never without their informing principle—call it habit, chemical affinity, polarity attraction or any word you may choose to express that atomic consciousness which is a part of all substance.

It will not do for the materialist to tell us that thought results from a mere fortuitous concurrence of molecules, for if thought is, it was and will continue to be, and there is nothing new under the sun except change in form. It is likewise true that old diseases are dying out with the old thoughts that begot them, and new and strange ones are springing into existence as the result of causes that lie deep in the minds of men. To this extent each man is in fact and fancy responsible for diseases, for with every

thought he adds to the sum total of the world's harmony or discord. Mr. Ingersoll, when asked how he would improve on the works of the Creator, replied that he "would make good health catching instead of disease." Had he been as much of an observer as he was an idealist he would have seen that good health and disease are equally catching, as we open ourselves to either one or the other, for men are creating their own bodies moment by moment. They are throwing the tendencies of the forces they have allowed to play through their brains upon every cell, and those tendencies of necessity become parts of their bodies. Is it likely then that the cells of the body will remain uninjured if dark, ugly moods are permitted to master a man? If the latter are repeated many times is it not natural to suppose that the cells will permanently alter—in other words become diseased? After a manner, to be sure, which the microscope may not discover, but which is nevertheless profound and affects, so to speak, the very life of the cell itself.

Knowing the currents that are rushing over the world to-day in its present condition, filled with beings ignorant of the purpose of life, it would be strange indeed if the earth were not covered and filled with disease. And then consider the intimate relation between mind and body, and that not a thought, which is a force, fails to exert its influence and make its imprint on the cells through which it flows. It is not unreasonable to suppose that a discouraged humanity to-day may be suffering from a heritage begotten during the dark ages of the world, when monastic orders were perpetually dissolved in tears and sought to shift the responsibility of their crimes upon the shoulders of a Saviour. The idea of vicarious atonement alone has liberated enough moral microbes to poison a solar system.

The object of life is the attainment of perfection and all nature is making toward that end. She produces and preserves for a time and then destroys her work, but nothing is lost or annihilated. The enlarged intelligence, the result of enlarged experience, builds for itself a more perfect form. Good and evil can have no existence per se, but are simply conditions depending on one's standpoint in the scale of evolution. To look longingly below, because one has learned to do well the lower, and because incidentally it may be pleasurable, is at least a relative evil; to look to the unattained or the ideal is a relative good.

Pain is the outcome of evil and is nature's method of calling attention to the disturbance. Although we can find perhaps nowhere a perfectly healthy body; yet it has been sufficiently approximated for us to know the general method of its operation, and that it has a system which should yield perfect results. Frequent lack of health is not due to the inefficiency of the system, but to the interference caused by the evolving human mind. The mind possesses the power not only of receiving impressions but also of creating or embodying them. The thought of a lemon will so affect the salivary glands as to produce a flow of saliva. That is to say, through the mental creation of the sensation the organ or set of organs to which it belongs is physically affected; just as the sensation of sourness created in the mind will affect the salivary glands, increase the blood supply, and could doubtless if continued daily cause an enlargement of the glands. So the created sense of disease in some organ that is uneasy and out of gear could eventually affect that organ to its utter destruction. Is it not suggestive that a body which nature has formed perfectly to suit one mind would be totally inadequate to meet the needs of another?

Molecules group themselves to form cells. The cells combine to form organs, and though each has a specific function it is subservient to the purpose of the organ. This, though a distinct entity, having duties which in no wise resemble those of any other organ, is yet dependent on every other organ; let any one fail and the whole system is thrown out of key. All the organs of the body are under the control of the nervous system, which in its turn yields to the final authority of the heart, and it with untiring energy sends its impulses to every ramification of the body. Let this energizing force which works through the heart withdraw itself and the heart ceases to beat. The molecules, however, continue their separate existences, but disintegration sets in and the body as an organism ceases to be. But those molecules have been affected for good or bad results by the aspirations of the one which was the guide of the little universe they inhabited. When he dies he leaves them impressed with the color and force of his thought, ready to be used over again by other organisms in the building of other bodies. Thus a double responsibility devolves upon humanity by its thoughts and deeds: First, as to the effect produced upon matter that may be incorporated into other organisms; and second, upon the molecules

themselves, their evolution being either aided or retarded by the proper or improper use man has made of the matter that was placed in his charge.

Hemetic philosophy holds that man is a copy of the great universe; that he is a little universe in himself, governed by the same laws that govern the greater, only reduced in time and sweep. Thus every cell is a life, and every life is part of the one life.

It would be of small value to know the etiology of disease unless to some slight extent at least it was suggestive of the remedy. Force being indestructible, it follows that the universal force is always unchanged in its totality and plays in every direction with equal intensity. The amount of pressure that we receive from it is regulated by the amount we consciously generate in ourselves. It rests with us to determine if the force shall play through us or upon us.

Without referring to physical details, which must of course be attended to, I believe the mental attitude is of at least equal importance. A meal eaten under proper conditions nourishes and strengthens; the same meal eaten in sorrow or anger is liable to produce indigestion. A long breath taken in joyous relief at work well done refreshes and energizes, a sigh further fatigues and depresses us; yet the action of the lungs and muscles has been almost the same in both cases. In combating bodily disease the endeavor should be to discover nature's method in dealing with its correspondent on the larger scale, which is that of pushing it downward to a lower plane or the one of least resistance and thus getting rid of it. It is true that those who desire to work evil and are upon the downward path can to a limited degree command nature's forces for evil purposes, but they do so at their own peril. All the force of the universe tends toward equilibrium, and mental destruction and bodily disease must attend those who seek to stem the current of the universe.

That all force works out on the line of least resistance applies as equally to diseases of the mind as of the body, and shows, not only the rationale but also the great danger in the "affirmations" and "denials" of a certain sect that has so recently sprung into prominence. Were it possible to heal all disease by this means, it could but result in a far worse condition of moral and mental destruction and spiritual degradation. The price paid for evil has always been suffering, and happy is the man who is permitted to pay his debt

upon the physical plane. It is axiomatic that all force is correlatable, and, if shifted from one plane it must appear upon some other. If mental treatment of disease should apparently destroy the consequences of the vice that produced it, it would permit the unhindered growth of vice and would be a total abrogation of all physiological law; and, in direct proportion to its success, would it make for permanent ruin.

The conservation of energy can not be confined solely to the material world, for growth would then be impossible. There could be but the repetition of some old act and never any progress toward a new one; but in the larger view every organism is, in varying degree, a focus or transformer for the unmanifested, unexpressed energy of the world, and according to the measure of capacity of the conscious intelligence that is operating through that body will evolution proceed. This further fact seems to show that where there is no conservation of energy there must be diffusion or disruption, or, as the Bible has it: "To him that hath shall be given, and from him that hath not shall be taken the little that he hath."

So, in tracing the various forces of nature through even a few of their correlations, we are forced to the conclusion that disease has no more existence of itself than has good or evil, but each is simply a condition produced in the vehicle through which consciousness is acting. Even the microbe pest is probably leading a perfectly physiological life as the ground upon which it is feeding yields to its ravages, or is living a perverted one as resolution is taking place.

That new diseases are appearing amongst us no well-informed physician will pretend to deny. They can not have sprung de novo, but somewhere and somehow must have had an adequate cause. That this cause lies in the mind I am thoroughly convinced. I do not mean that right thinking will make a perfect body, free from disease in a few months or years, for our bodies are the result of ages of thinking; but it will help to produce better bodies in the future. The breeding of animals trained to special acts is now pretty well understood; humanity alone begets its offspring as a secondary consideration, and more thought is bestowed upon the first than the last.

That the emotional nature breeds toxins in the economy is now proven beyond controversy, and, since it has at last received the

mint-stamp of regularity, it is recognized by the medical profession at large. It will be a great day for humanity when authorities, in sorting over nature's facts, shall be willing to acknowledge others than those that seem to bolster up their especial prejudices. To give an illustration, contrary to present opinions, one called from the ancients who, at last, are beginning to receive a tardy recognition of their tremendous knowledge of the cosmos in general and of man in particular, it is said that "we die not from lack of life but from its excess." When we arise in the morning fresh and vigorous, it is because we have less vitality in our system than when we lie down at night worn out with the day's work. If life is omnipresent and enters into the composition of everything it must be like water and assume the form of the thing into which it enters; but the human mind, like a great transformer, forces the body into more active vibrations during our waking hours than during sleep; as a consequence, more of the life principle will be forced into us, until the activity of the cells, forced far beyond their natural gait, become so excessive that we are forced to take a rest. An uncured mind would in a short time disintegrate both body and brain. An engineer would say that we have to blow off a little of the surplus steam, and lucky is the man who can consciously put his finger upon that safety-valve.

There is in our social and business atmosphere a deadly ferment. Its name is Self. It is the great heresy of separateness. Until we recognize that there is but one humanity; that we are all parts of the one life, just as there are many stars but only one light; that we have many brains but there is one mind that fills them all and each takes what he can; that man is of necessity his brother's keeper; that every thought we permit to enter into our minds adds to the sum of the world's happiness or misery—until we recognize and practice all this there will be little hope of banishing disease. However, I am optimist enough to believe that the dawn of that day has already broken; that he who from the mountain top views conflicting hosts sees them even now making for a common goal. Some day they will meet and, joining hands—Capital and Labor, Science and Religion—there will be formed that mystic cross within whose charmed circle humanity shall toil and sweat no more in vain, but man's feet be placed upon the path that leads to liberation.

In conclusion, let me say that no man was ever converted to a

new belief. If he comes into it it is because it is the extension of a previous one. In other words, if a man has no experience with which to correlate a new idea he can not expect to approve or understand it. If he has no mental niche into which a fact can be shot, so much the worse for the fact—perhaps.

Discussion. *Dr. James Truman*, Philadelphia: I never saw this paper until I heard it read just now, yet I am expected to talk on a metaphysical subject on three minutes' notice. I may have misunderstood the essayist, but I believe his idea is, that through the action of the mind the body can become diseased, and that to understand the etiology of disease we must study the effect of mental action on the organism. We all know that the mind acts upon the body, but are we to understand that pyorrhea, etc., are caused by some action of the mind? We often hear of toothache being stopped by the sight of the dentist's tools, and this is unquestionably the result of mental action upon the nerves. We also admit that it is possible for mind to so act upon the body as to cause occasional disease, and when the mind can be energetically acted upon disease is often overcome. This seems to be about the substance of the paper.

Dr. E. T. Darby, Philadelphia: I have listened with much interest to *Dr. Hungerford's* paper, because he has set forth therein that intimate and mysterious relationship which exists between mind and matter, but I do not see the bearing which has been put upon the subject that we are met to discuss, and I do not feel competent to discuss it intelligently.

Dr. M. Albrecht, Indianapolis: For six years I was afflicted with an eczema which would not yield to medical skill, but I was cured in six weeks with the help of metaphysical treatment, my physician and I living many miles apart. The study of this subject has given me the power to control in some degree conditions in my patients which have been a source of inconvenience. I used to frequently have to send patients home because they complained of headache or cold or nervousness, but during the last two years I have told them that their ailment would not interfere with my work, and I would cure them, and I have cured dozens of colds, coughs and headaches in from five to fifteen minutes. Where the limit of my possibilities is I do not know, and if any of you will honestly investigate the matter and make it a sincere study, you

cannot fail to confer the same blessing upon yourself, your patients and humanity that I have done.

Dr. J. W. Cormany, Mt Carroll, Ill.: Some weeks ago my brother at Cincinnati met with a very painful accident, and his friends and the physicians who treated him became much alarmed, believing that blood-poisoning and gangrene would set in. I said, "No, it shall not be," and from that time on—

The President: I think this is hardly on the subject of the paper.

Dr. Cormany: I just wish to give an illustration of the power of thought to cure disease. From the moment when I said it should not be all the unfavorable conditions subsided and my brother has remained in a normal condition without any rise of temperature, without anything to interfere with the perfect progress of the work of nature in his restoration. I spent \$1,500 in one year without result to have my wife cured, and she has since been cured without medicine.

Dr. Wm. Crenshaw, Atlanta: In line with the bosh to which we are listening, I would state that a short time ago a gentleman told me that a friend of his in Chicago fell out of a twentieth story window and was coming down heels over head, when one of these Christian Scientists made a few passes at him from the other side of the street, and the man went right back up and crawled into the window, not being hurt at all.

Dr. G. V. I. Brown, Milwaukee: I wish to protest against an attempt to make ridiculous a beautifully worded, carefully thought out, and valuable scientific paper. Such a thing should not be done in this association. If the gentlemen had followed the line of thought suggested by the essayist in the matter of the pain habit, they would have found quite enough to occupy them along strictly scientific lines, without wandering into Christian Science or other subjects which we do not understand. No man who deals with neuralgic cases fails to realize that the pain habit is a real thing. When we have removed the etiological factor per se we still have the habit, for the vibrations that produce manifestations of pain continue, and it often takes much care and patience to overcome the outward manifestations of the trouble.

The President: I trust that in the further discussion the gentlemen will confine themselves strictly to the subject of the paper.

Dr. Hungerford, closing discussion: We have so many papers on dentistry that I thought you might possibly enjoy something outside of it, and I was pained by the remarks of Dr. Darby, for I am sorry that any man can get to the point where he is unable to see that the acquirement of any knowledge is advisable. If Dr. Darby says that this subject has no bearing on dentistry, I would say to him as Goethe said to the man who knew only his own language, that he does not understand his own profession. I fear I am unable to speak any language, if I could have been so misunderstood by the gentlemen who talked on Christian Science. I said that in proportion as that idea made for success it made for the ruin of the individual, and it does. I thought that the whole tenor of my paper was against the ideas and practices of the so-called Christian Scientists. If it is possible to cure disease in the way they claim, then we may indulge in every sensuality and crime of the physical nature. If you can obliterate the effects of crime and vice, the result is the absolute and total destruction of the man himself. It is better that the body should be racked than that the mind should be destroyed, and it is better that a man should be a cripple than that he should be in a lunatic asylum.

As I was saying, the men who know nothing except their own profession know very little about it. One of the difficulties with many men in the medical and dental professions is, that they never pretend to garnish their minds with collateral sciences, with art and literature, and with all those studies which enable men to broaden themselves and to be of benefit to others.

EDUCATION OF THE PUBLIC IN REGARD TO DENTAL HYGIENE.

BY H. L. BELCHER, D.D.S., BUFFALO, N. Y. READ BEFORE THE ROCHESTER DENTAL SOCIETY, MARCH 12, 1901.

During the past few years marked advances have been made in dental science, and practical information of inestimable value has come to the profession. Much has been accomplished along the line of successful prophylaxis, and we are enabled to treat the oral cavity in a more intelligent manner than ever before. This places us in a position where we can approach the highest possibilities of the dental art, but in order to do this we must have the hearty cooperation of our patients. We see on the part of some a deplora-

ble neglect of such duties as are necessary to preserve the natural teeth in a healthy state, so we can imagine how much more the masses, who seldom visit a dentist, need to be brought to a realization of the importance of caring for the mouth and its relation to the general health. We cannot expect that the evil effects of neglect of the dental organs will be common knowledge, but it is to be regretted that many of the most intelligent people pay scarcely any attention to the care of their mouths.

I quote from a paper of Dr. Ernest Jessen of Strasburg, which emphasizes this fact; "Great sums of money are spent in order to go to the country, to the mountains, or to the seashore, in order to breathe an atmosphere that contains less microorganisms than the one surrounding great cities, milk is sterilized in order to kill the bacteria that may be present, but in the mouth where true microbic growth is carried on, no precautions are taken. From the mouth these microorganisms can penetrate the interior of the cranium, the salivary glands, lungs, and even into the general circulation. Even in the mouth these accumulations of bacteria very often cause inflammation which can become very serious."

Miller says that "As much attention should be paid to the mouth in cases of digestive troubles as to the diseased stomach. Want of appetite, bad taste, and especially fetor of breath, that are supposed to originate in the stomach, are caused only by a neglected and unclean condition of the mouth. These statements prove to us that the masses of bacteria found in unclean mouths, independent of those introduced with the food and beverages, are sufficient to provoke fermentations and chronic dyspepsia."

For the past few years I have been associated with the dental college infirmary in our city, which contains forty chairs. Thousands of patients are treated there every year. A fee is charged for material used, and much good is being done for the poor. It is a salvation to these people, for they could not pay an ordinary fee to a regular practitioner—some being so distressingly poor that even the smallest sum would be impossible. We render some charitable service, but do not do so much in this direction as we should like, having no endowment. We find, on examining the mouths of some of these patients, that they ignore dental hygiene altogether, but after learning the true condition of affairs they seem eager for advice. Some of these patients are pitiable objects, and are poorly nourished.

We see a great deal of anemia, general weakness, diminished resistance to disease, etc. In reprimanding patients of this class for negligence they are apt to reply, "No, doctor, I seldom clean my teeth, they are so sensitive. I tried it once and it made my gums bleed. It comes from taking medicine, and seems to run in our family. My father was bothered in the same way, too."

I was much interested in reading recently "A Treatise on the Management of the Teeth," by Benjamin James, a member of the Massachusetts Medical Society, published in 1814. Considering the time of publication it reflects credit upon the writer. I will quote an extract from the subject of "Tartar" as follows: "The quantity of tartar which collects about the teeth is occasionally so enormous that cases are known of persons who have had all the teeth of each jaw enveloped in one continued coat of it; a circumstance which has given rise to those stories propagated by the wonderful magazine, and by those who love to deal in the wonderful, of people who have only one tooth in each jaw extending from ear to ear." Even in this enlightened period we occasionally find tartar as bad as that depicted by Dr. James.

I know of no such dental service for the poor in this country as may be found in the "Gustave Mellin Institution" at Hamburg, Germany. "The purposes of the institution are, First, to give dental treatment to the poor of Hamburg; second, to treat the teeth of poor school children according to a determined plan; third, to work for the advancement of odontology by means of scientific research. In order to obtain these results the teeth of one thousand children are treated yearly, one thousand artificial teeth are gratuitously inserted in poor people's mouths, and the hospital is open every week day from nine o'clock until six for the treatment of diseases of the teeth." The Institution is provided with an endowment of \$125,000, and up to this time its founder, M. Gustave Mellin, an Englishman, has also made a yearly donation of \$10,000.

The question arises, How can the dental profession best reach the masses and interest them, and secure their cooperation in matters pertaining to the care of the mouth? From time to time tracts, pamphlets and papers containing information on this subject have been distributed, but there has been no organized effort by the profession to present the subject of "Oral Hygiene" to the people. We realize the difficulty of the undertaking, and we also appreciate

what might be accomplished for the good of the public health. Furthermore, naturally an increased demand for dental services would result.

Dr. J. P. Corley of Greensboro, Alabama, read a paper on "Popular Dental Education" before the National Dental Association last July. An extract follows: "At its last meeting the Alabama Dental Association assumed the responsibility of educating the people of its own state. A 'ways and means' committee was appointed, with authority to employ and equip a lecturer whose duty should be to make a tour of the state, under the auspices of the association, lecturing to the public in such places as the committee might direct. This 'ways and means' committee proposes to make the scheme self-supporting. Every section whose local dentists will contribute to the finance committee a sufficient amount to defray the expense shall have a share of the lecturer's time. This lecturer could be equipped with a stereopticon, drawings, models, etc., and could prepare lectures for mothers, school children, and the general public. Being an employe of the association he could do evangelistic work among the dentists, thus strengthening the organization." Dr. Corley concluded by asking the national body to consider the matter. The efforts of the Alabama Dental Association to educate the people of its own state are worthy of our investigation and study.

It has occurred to the writer that the best and quickest medium would be the daily newspaper, for it reaches the masses. If our state society had access to the press much good might be accomplished for the benefit of the public health. Instruction in regard to these matters should begin in the home, for children inherit ignorance from their parents just as they do disease. The textbooks on the subject of hygiene in use in the public schools are deficient, from the fact that they say very little if anything in regard to the teeth. It is the duty of the schools to teach not only that the body requires some rational care and attention, but special stress should be laid on the hygiene of the mouth and its vital relation to the whole body.

Much more might be accomplished for suffering humanity if the average physician were not so surprisingly ignorant in all that pertains to dentistry. He should receive special instruction, or attend a course of lectures at one of our dental colleges, just as he does

for other special branches of medicine. In making this statement in regard to the ignorance of the physician I do it purely from a dental standpoint. Much might be said in regard to the ignorance of the average dentist concerning matters medical. I am also aware of the fact that the average physician does much more charitable work than the average dentist. Ten physicians are employed by the city of Buffalo, and each averages over one thousand visits yearly. They receive a salary ranging from two to five hundred dollars. Dr. Ernest Wende, health commissioner, says that for surgical and lying-in cases they average from eight to ten cents a visit.

The inauguration of free public baths for the poor in some of the larger cities deserves mention. "If prevention is better than cure, then the establishment of a free public bath is a greater blessing to mankind than the erection of a hospital." We may secure legislation for the care of the public health, in fact, may do many things in this direction, but there will not be the advance or real improvement there should be, commensurate with the time, energy and money expended, until the laity better appreciate the benefits resulting from a willing and intelligent obedience to nature's laws.

EVOLUTION OF THE PREMOLARS.

BY A. H. THOMPSON, D.D.S., TOPEKA, KAN. READ BEFORE THE NATIONAL DENTAL ASSOCIATION, AT MILWAUKEE, AUG. 6-9, 1901.

At the last meeting of the National the writer had the honor of presenting a study of the evolution of the complex molars from the simple cone, in which the process of the formation of the many varied and complex types of mammalian molar crowns, by the modification and multiplication of the simple reptilian cone, was described. As Osborn says, "The primitive form of the mammalian molar was the single cone, to which all other cusps have been successively added by the slow process of transformation of the single-fanged, reptilian, conical tooth." This primitive, simple cone is called the *protocone*. To this cone was added, by cusp duplication, first, upon the anterior or mesial side, the *paracone*; then one upon the distal side, the *metacone*. This made a crown with three cones in a row, called the *triconodont* form. Then these three cones shifted their positions so as to form a triangular crown, the *protocone* moving to the lingual side and the *paracone* and the

metacone to the buccal side of the crown, thus forming the *trigon* of the upper molar. To this trigon was subsequently added, distolingually, the heel or *talon*, carrying the fourth cone or *hypocone*. This constituted the quadritubercular molar of the upper jaw. In the lower jaw the position of the three cones was reversed, the single *protoconid* moving to the buccal side and the others to the lingual, so that the primitive triangles passed each other with a shear-like motion. Then later the *talonid* was developed to support the tubercles which struck into the valley of the opposite trigon of the upper molar in the evolution of a more complicated masticating armature.

The history of the evolution of the premolars, however, is quite a different story, for the process of arrangement of the primary cones in the course of their differentiation and elaboration varies greatly from that of the true molars. The evolution of the latter is quite simple and the process is readily grasped; but not so with the premolars, in which it is more complicated and not so well understood. As Prof. W. B. Scott says, "The premolars have quite a different history, even when these teeth have become completely molariform; as the elements which correspond in function and position to those of the molars are not homologous with them, the key to these homologies being given by the position of the protocone. The premolars do not display quite the same degree of constancy in the order of succession of their component cusps as do the molars. * * * The primitive form of the premolar is the simple cone, implanted by a single fang, which is still preserved by several existing genera and which obviously corresponds to the protocone of the molars. In early geological times, however, this was complicated in almost every genus by the addition of a second cusp upon the inner side of the protocone, which may be called the *deuterocone*. (Fig. 1.) This bicuspid tooth represents a pattern from which all the premolar types of the higher mammalia may be simply and naturally derived by the continued addition of new parts which in many groups reach the same or even a greater degree of complication than the true molars. Furthermore, this tooth brings out clearly the important fact that while in the molars the protocone has shifted to the internal or lingual side of the crown (above), in the premolars it remains upon the external or buccal side of the crown (A. Fig. 1), just as in the inferior molars.

From this it follows that the deutocone has no exact homologue in the molar crown, though functionally and in position it corresponds to the protocone of the molar."

This important divergence makes a distinct difference between the premolar and the true molar above which must be taken into account. The construction of the two is essentially different—the protocone of the molar moving to the lingual, and the protocone of the premolar moving to the buccal side of the crown, and then the deutocone is essentially a premolar cone, not being developed as such in the molar scheme. These differences mark off the premolars from the true molars as being very divergent as to the plan of the arrangement of the cones and the process of the evolution of their crowns which is much more complicated and confusing in the premolars.

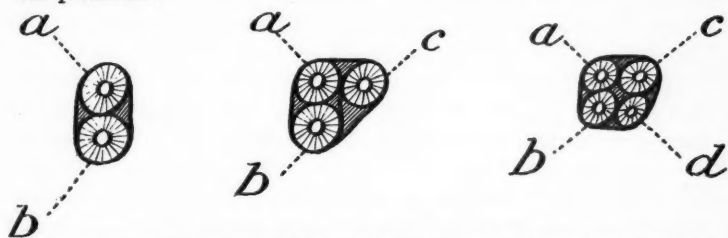


Fig. 1.—Scheme of the evolution of the upper premolars. *a*. Protocone. *b*. Deutocone. *c*. Tritocone. *d*. Tetartocone.

The extensive series of the premolars in many mammals shows in early geological forms that these teeth have become progressively complicated from the posterior to the anterior—the reverse is the rule in the molars. Scott says that "In these early mammals the anterior premolar teeth are for the most part as yet perfectly simple, consisting of the protocone only. In some genera the second and third have merely the addition of the deutocone. In the true molars new complications very generally make their appearance upon the first of the series and then successively upon the second and third; but in the premolars the fourth is the first to present new features and then these advance to the anterior premolars"—the first never being so complicated as the others.

The addition of the lingual cusp, the deutocone, to the external or protocone is that type of the premolars with which we are most familiar in man as the bicuspid. This simple type is very

primitive and follows next after the single conicle or monocuspid type of this tooth. Dr. Harrison Allen years ago called attention to the process of the evolution of this simple type. He said, "An incisor and cuspid tooth are composed respectively of one cusp and a small cingule; a bicuspid, of a cusp and a large cingule which participates in forming the triturating surface; a molar, of three cusps and a cingule, etc. * * * A true development occurs from the cuspid and incisor series toward the molars, so that the cingule of the cuspid becomes the cusp of the bicuspid. * * * In describing a normal upper bicuspid we would state that its single buccal cusp is the 'cuspid' cusp and that its palatal is its true 'bicuspid' cusp—i. e., the cusp which creates a bicuspid tooth out of a cuspid." In this remarkable insight into the principles of tooth evolution Prof. Allen anticipated the later elaborate researches and discoveries of Cope, Osborn and Scott which have done so much to illuminate this wonderful study.

From the primitive bicuspid type the premolars were further elaborated by the addition of other cones, so as to make the crowns more complicated, as it were, to be in harmony with the molars in the same denture. Scott says further, "The second stage of premolar development consists in the addition of a second external cusp posterior to the protocone, which I have called the *tritococone* and which corresponds to the paracone of the molar; but it cannot be regarded as homologous with that element because its position with reference to the protocone is entirely different. (C. Fig. 1.) This stage of development imitates very closely the trigonodont molar and very frequently this type of premolar displays the intermediate conules, either anterior or posterior or both. In position these conules correspond to the proto- and metaconules of the molars but are obviously not in harmony with them. * * * This trigonodont stage of the upper fourth premolar is very widely distributed in the middle and upper Eocene. * * * With some special modifications it persists to the present in the sectorial of the carnivora, in many insectivora and in some ungulates. * * * The first step in the conversion of the premolars to the molar pattern is given by the addition of the fourth main element at the posterior internal angle of the crown, the *tetartococone*, which corresponds to the hypocone of the molar. (D. Fig. 1.) * * *

"So far as I have been able to observe, the development of the

upper premolar appears to be quite constant, * * but the development of the inferior seems to be somewhat less regular and constant. As with the upper jaw, the complication begins with the fourth premolar and advances anteriorly, but it is worthy of notice that in many forms the complication of the inferior premolars begins earlier and advances further than in the case of the superior teeth. As before the initial point must be taken as a simple conical cusp, the protoconid. (A. Fig. 2). Most of the existing unguiculates, as well as some recent and many extinct ungulates, retain a few teeth which depart but little from this type. In many forms the only addition to the protoconid consists of a small posterior buccal cusp, as if the equivalent of the metaconid of the molar. (B. Fig. 2.) In many of the carnivora a secondary posterior cusp is added, * *

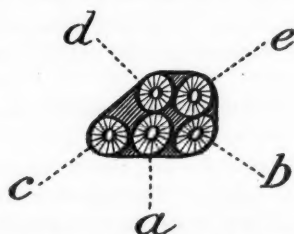


Fig. 2.—Scheme of the evolution of the lower premolars. *a*. Protoconid. *b*. Metaconid. *c*. Paraconid. *d*. Deuteroconid. *e*. Tetartoconid.

frequently also an anterior buccal cusp strictly conformable to the paraconid of the molars (C. Fig. 2), and a stage like that of the triconodont molars is attained, consisting of elements which we may regard as homologous with the three primary cusps of the molars. There is, however, a great difference as to the regularity with which the para- and metaconids are present and in the order of their succession; one or the other may never appear at all. * * * In the premolars, when a cusp occurs occupying the position taken by the metaconid in the molars, it cannot be regarded as homologous with that element, but rather with the deuterocone of the upper premolars, and may consequently be called the deuteroconid. (D. Fig. 2.) The latter also varies as to the relative time of its appearance; sometimes it is the only element present in addition to the protoconid, or it may be developed after either the para- or metaconid, or it may appear last of all and in many cases it is

altogether absent; yet when it does appear its homologies are perfectly obvious.

"A fifth element is sometimes added to the premolar crown below, posterior to the protoconid and interior to the metaconid, thus occupying the position of the entoconid of the molars. (E. Fig. 2.) Clearly, however, it cannot be homologous with that element, its place in reference to the metaconid being entirely different. Its homologies are rather with the tetartocone of the upper premolars, (D. Fig. 1.) * * as the primary cusp or protocone remains upon the external side of both the upper and lower premolars. The tetartoconid is usually the last cusp to make its appearance upon the crown of the inferior premolar, but there are exceptions to this rule. For instance, in one fossil form the lower fourth premolar consists of a very large protoconid and a large but lower heel or talonid, made up of the metaconid upon the outside and the tetartoconid upon the inside, neither the para- nor the deutoconid being present."

These very unusual complications and variations make the study of the evolution of the premolars very difficult and confusing and take it far from the simplicity that characterizes the pathway of the evolution of the true molars. The protoconid seems to be the only one constant element, and not even the deutoconid, the especial premolar element, and which naturally should occur in the next grade of frequency, can be relied upon. This characteristic element should be more permanent. Indeed, the subsequently added elements show scarcely less variability and inconstancy than the deutoconid, which is very unusual. In the molar system the latest added elements are the most variable and the first to fall in the process of retrograde evolution, but in the premolars the first added element, the deutocone, seem to be quite as variable and inconstant as those which are added later. The hypoconulid of the lower second molar and the hypocone of the upper second and third molars, for instance, are inconstant and variable by reason of being added latest and are therefore the first to fall in retrogressive evolution. With the premolars, however, the first added to the primary element may fall and the later added elements persist, which is quite unusual and unique in tooth evolution.

As Scott says again, "The foregoing survey of the steps of premolar development in those mammalian groups which enable us to

follow it out show very clearly that the premolars follow an order of differentiation quite at variance with that attributed to the molars, even when the final results are the same. In the upper fourth premolar the order of succession of the cusps is remarkably constant, while in the other superior premolars and in all of the lowers the order is very much less regular although their homologies are clearly apparent."

While in many lower mammals the premolars are much elaborated, notably so in the ungulates and the plant-eaters, in the primates they are very simple and comparatively undeveloped, presenting the simple bicuspid type which consists only of the protocone and the deutocone. Scott says, "In the higher primates the premolar type is that of the human bicuspid, the crown consisting of two elements only, the protocone and deutocone. (A. B. Fig. 1.)

* * * In *anaptomorphus* (a fossil lemur) the lower premolars are simple, having a high, acute and recurved protocone with a rudimentary metaconid on a heel, * * but the upper ones have added a deutocone which is particularly well developed in the fourth premolar. * * * Other fossil forms have four premolars also, but the anterior are small and simply conical, and the posterior two in each jaw have added new elements. In the upper jaw the crowns of the third and fourth are transversely placed, consisting of a trenchant, pyramidal protocone and a smaller but well developed deutocone. In the lower jaw the third premolar has in addition to the protoconid only a rudimentary metaconid forming an inconspicuous heel. In the fourth premolar this heel is better developed, and on or at the side of the protoconid appears a small deutoconid. In the existing representatives of the primates there is not much advance upon the degree of premolar complication found among the early Eocene forms." In fact, down through the long list of primates to man the form of the premolars is extremely simple and undifferentiated—the bicuspid type with little variation, except as to the prominence of the lingual cusp or deutocone, is found throughout the entire line. In man the second lower bicuspid with the three tubercles is probably a reversion to the form when the deutoconid and tetartoconid were fused and then divided. They seem to become separated in the higher races, but the lingual cusp is a continuous crescent in the primates and the lower races of man.

In the *insectivora* there is considerable elaboration of the premolars, even in fossil forms. The tritocone and the tetartocone are added above so as to simulate a molariform type that is highly specialized. In some genera the fourth premolar is more complicated than the true molars. In the *carnivora* (Scott) "The premolars acquire a very great degree of complication. In the *pinipedia* the molars and premolars are very much alike, although this is due rather to the simplification of the molars than to any complexity of the premolars. They may be mere conical bodies, as in the *otariidae* and hooded seals, with a crown consisting of a simple cusp and implanted by a single fang; or as in the typical *phocidae*, where both molars and premolars are of one type, characterized by the suppression of the internal cusps and the addition of the sharp, low cusps on the anterior and posterior edges of the principal cone, which appear to represent the paracone in the upper molars and the protocone of the premolars of both jaws and the lower molars. The lower premolars of the *carnivora* are always more or less simple and trenchant, though they vary some in respect to thickness, height, acuteness, etc. They generally display the metaconid, and sometimes an additional basal cusp is formed by the elevation of the cingulum posterior to the metaconid. The paraconid is seldom developed but occurs in many of the *viverrines*.

"The *perissodactyla* are characterized by a very high degree of premolar differentiation. In all of the existing families these teeth have assumed the molar pattern, a tendency which very early becomes apparent in the ancestral forms and even in the extinct phyla." In the early fossil forms these teeth are of course much more simple, but they soon tend toward the complicated pattern of the molars so that the resemblance is very early made apparent. This is shown in the third and fourth premolars which "resemble the molars on the buccal side, having proto- and tritocones of nearly equal size, and the anterior pillars largely developed. Internally, however, there is but one cusp, the deuterocone, which sends out two crests toward the outer wall of the tooth. These crests appear to be developed from conules analogous to those of the molars with either the deuterio- or the tritocone. The inferior premolars vary somewhat in different species. The third is very simple, having only a small metaconid added to the compressed and acute protoconid. The fourth has also two internal cusps, the deuterocnid in

front and the tetartoconid behind. The number of cusps present is thus the same as in the molars, but the small size of the internal elements and the low heel give to the crown a very different appearance." This structure of the premolars is largely typical of many of the fossil progenitors of this group and even the types of the recent forms are but little modified except in the direction of further elaboration by more intricate foldings of the crests and ridges, which is characteristic of contemporary selenodonts.

"The *artiodactyla* group never attains the high degree of homodontism that is characteristic of all the later perissodactyls, and yet it displays a considerable amount of premolar complication, and one which is brought about in very different ways in different groups of the order. In the most primitive type the premolars are quite simple, the third and fourth upper premolars having as a rule one external and one internal cusp, the protocone and the deuterocone respectively. The lower premolars are also extremely simple, being elongated in the antero-posterior direction, and have compressed trenchant crowns which are made up of the large protoconid with minute but distinct and sharp para- and metaconids." From this early type the premolars were modified and elaborated by the extension of the crests and the modification of the constituent cones. There is a somewhat regular development in the group except in some of the *procamelus*, "which appear to depart from the typical order, in that the inner crescent of the second and third premolars is formed, not by the extension of a single element, the deuterocone, but by the coalescence of two; but the posterior part of the crescent is probably homologous with the deuterocone."

This general study of the evolution of the premolars necessarily leaves much unsaid, but will perhaps in a degree serve to show something of what has been accomplished in the direction of unraveling the complicated process, which is unique in its difficulties in the field of tooth evolution.

ATTACHMENT OF IMPLANTED TEETH.

BY W. C. BARRETT, D.D.S., BUFFALO. READ BEFORE THE NATIONAL DENTAL ASSOCIATION, AT MILWAUKEE, AUG. 6-9, 1901.

There has been a great deal of speculation concerning the exact nature of the secondary formation which attaches teeth in instances of replantation or implantation. The theory has been advanced,

and is still held by many, that it is by a true bony ankylosis. This seems impossible when we consider all the homologies of the case. The connection of the tooth is a true articulation by gomphosis. All arthroses, or jointing of one bone to another, must be either movable or immovable, or of a mixed type which need not now be considered. I present a simplified tabular arrangement of them:

ARTICULATIONS.	SYNARTHROSES. (Immovable Joints.)	SCHINDYLESES. (Grooved Joints.)	Ethmoid and Vomer.
		GOMPHOSES. (Socket Joints.)	The Teeth.
		SUTURES. (Serrated Joints.)	Lambdoidal, Sagittal.
	DIARTHROSES. (Movable Joints.)	ARTHRODIA. (Gliding Joints.)	Metacarpal, Metatarsal.
		GINGLYMUS. (Hinge Joints.)	Elbow Joint, Ankle Joint.
		ENARTHROSES. (Ball and Socket.)	Hip Joint. Shoulder Joint.
	AMPHIARTHROSES. (Mixed Joints.)	Body of Vertebrae, Symphysis Pubis.	

The biarthroses, or movable articulations, are of three kinds: (1) The arthrodia, or gliding joints, in which the bones move upon plane surfaces. (2) Ginglymus, or hinge-like joints, with only backward and forward movements. (3) Enarthroses, or ball and socket articulations.

The synarthroses, or immovable articulations, those without any synovial cavities are: (1) Schindyleses, those in which a plate of one bone is received into a fissure in another, a grooved attachment. (2) Gomphoses, in which a process is inserted into a socket. (3) Sutures, in which there is a serrated interlocking of bony processes. In all these methods of articulation there must be a separating membrane which prevents union of the two articulated surfaces, and without such membrane there can be no true articulation. Even in the closest sutures it exists; and in the synarthroses it is usually very persistent, save in extreme old age. The attachment of the teeth is by a true gomphosis, the root being inserted into a bony socket, the articulating membrane being the pericementum.

In the diarthroses, or movable articulations, the attachment is more compound than in the immovable joints, and there is a synovial cavity and membrane, whose office it is to furnish a lubricating fluid for the movable joint. It is possible in cases of arthritis for the synovial cavity to become obliterated and the mobility of the articulation be thus lost. Then a condition analogous to that in instances of fracture of a bone may succeed. As a direct result of the succeeding inflammation, plastic lymph is deposited, and in process of time organized into osseous tissue, uniting the two bony surfaces and forming a true ankylosis; but in such instances it is a union of homologous tissues—bone is united to bone.

While the teeth for anatomical purposes may be considered as bone, they are really such modifications as make them analogous but not homologous to it. Their structure is not identical with that of bone, but materially differs from it. It is a law of nature that unlike tissues will not unite; they cannot be joined together to make a homologous whole. In biology the identity of species is maintained through the fact that one cannot be fecundated by a different one. If two of them are so nearly homologous that hybridizing is possible, the issue is usually sterile and cannot procreate and erect the hybrid into a separate species.

The structural difference between bone and the dental tissues is quite marked. In the former we have the regular concentric arrangement of the lacunae around a nutritional center—the so-called lamella. Cementum, which is nearest to bone in structure, is without this lamellar arrangement, while it retains the lacunal corpuscles and the canaliculi or communicating fibres. Dentin has lost the lacunae, but retains the canaliculi in their analogues, the dentinal fibrillae. Enamel has lost even the canaliculi and is practically without organic structure. The differentiation of enamel from dentin, or of dentin from cementum, is not greater than that of cementum from bone. No one ever claimed that dentin and cementum are sufficiently homologous to permit of their union. How, then, shall bone and cementum become one? Yet this must practically take place if ankylosis is accomplished.

The usual conception is that the pericementum of the implanted tooth being destroyed, the union will be analogous to that taking place when the ends of a fractured bone are united; but in the latter instance the sundered or fractured tissues are absolutely homo-

logous—identical in structure. With the implanted tooth there is nothing more than an analogy existing between its cementum and bone. Admitting that the plastic exudate, or lymph, is the same in implantation that it is in fracture, into what shall it be organized for the purpose of uniting tooth and its investing bone? Into osseous structures? But that is not homologous with cementum and will not unite with it. Into cemental tissue? But that is not homologous with the bone and will not consolidate with it. Is there a possibility of such a modified hybrid structure as may blend with both? No such structure is known to anatomists or histologists or has ever been demonstrated.

If a modified ankylosing tissue were possible, what would be its genetic origin? Bone is organized either by calcification of a cartilaginous matrix or through the action of a membrane. Ankylosis presupposes the absence of any membranous organ; but cemental tissue is positively of membranous derivation, and any modification of it must have at least a modified membranous matrix.

Admitting that the ankylosing tissue is of a bony character, how shall it be nourished? That requires either some nutritive membrane or the lamellar structure of bone. There being no Haversian system in cementum, or in any tissue which could unite with it, there follows the inevitable conclusion that, admitting the possibility of an ankylosing structure, its integrity could not well be maintained by any practicable nutritive currents.

The pericementum of an implanted tooth being destroyed, the vitality of the cementum, which is dependent upon it for nourishment, must in case of ankylosis be an impossibility. Under such circumstances it is in the highest degree an absurdity to suppose that the ankylosing tissue could become attached to it. The living does not identify itself with the dead, the one functional and the other functionless.

In case of loss of an implanted tooth, it is always through the formation of osteoclasts or giant cells, and the resorption of the root succeeds precisely as in the case of the normal removal of the deciduous teeth. It is well known that secondary tissue is much more likely before its final perfection to pass through degenerative changes than is that which is primary. It might be fairly anticipated from the method of attachment of an implanted tooth, through the formation of secondary structures, that this newly formed tissue would

be first to be resorbed, and that the tooth would come away intact, but we do not find this the case—it is always through resorption of the tooth itself.

There has not yet been presented to the world a sufficiently authenticated instance of such secondary ankylosing tissue in the socket of an implanted or replanted tooth. In the *Dental Record* for April, 1901, is an able article by G. W. Watson, L.D.S., in which is represented an instance of what he believes to be bony ankylosis of a tooth; but it was not one that had been implanted or replanted. It was an instance of an extraction which brought away a portion of the socket with the tooth, and in which it was claimed there was no appearance of a pericementum. There was no secondary deposit, but simply an apparent absence of a limiting membrane. We know that certain sutures with the lapse of years become apparently obliterated; but these are articulations of absolutely homologous tissues, whereas, as has already been shown, cementum and dentin are only analogous. In the slides illustrated it does not appear to be demonstrated that there is any melting of the one tissue into the other, but the cuts are not sufficiently clear positively to demonstrate either the truth or the falsity of the claim to true ankylosis. It is quite conceivable that the membrane may have been almost infinitely attenuated, or even entirely lost, without true ankylosis resulting.

Mr. Storer Bennett, a very competent authority, in 1898 read before the British Odontological Society a paper in which he detailed several cases of what he claimed to be ankylosis of teeth, but the same objections that may be urged against the instance of Mr. Watson would appear to be applicable to those of Mr. Bennett. It does not appear that there was any union between the unlike cells of the bone and the cementum.

The union of the teeth of fishes to the jaw has been cited as an analogue and an ankylosis. There is no kind of articulation of the teeth of fishes to the jaw. They are absolute processes or prolongations of the jaw, and the bases of such teeth are homologous to the jaw, or are modified from it as bone is produced from cartilage, by the mere infiltration of lime salts, the basal structure being the same. In species in which they are not such processes no true ankylosis exists. Hence there is little of parallelism.

What, then, must be the method of attachment in cases of

implantation and replantation? That which from the very circumstances of the case appears most obvious. There must be a new formation of membrane of pericemental and periosteal nature. Of course the possibility of the revivification of the old dead membrane is too absurd for serious consideration. Why should it be thought a strange thing that pericementum should be reformed, any more than that new bone should grow? We know that in wounds and injuries new periosteum is formed and becomes functional. There is quite as probably a genetic origin for pericementum as for periosteum. The plastic or organizable lymph which is the product of inflammation may as readily be transformed into membrane according to the type of that already in existence as into bone.

Admitting, then, what appears most probable, the formation of a new membrane of pericemental nature, what would naturally follow? The deposition of bone upon the periosteal surface through the formation of osteoblast cells, which will unite with the homologous bony walls and fill the existing cavity. Upon the pericemental surface of the membrane the condition is quite different. The cementum of the implanted tooth is without vitality, the lacunal cells being dead. It is scarcely possible that there can be any revivification of them, hence the cementum must remain in practically the same condition as the devitalized dentin. There is no instance, so far as we know, in which there has been any new cemental growth in such cases. The new formation must be confined to the osseous tissue, and the new pericementum must closely invest the root; but the fibers of Sharpey may penetrate the cemental structure as they do the bone, and thus hold the tooth as firmly as though it had never been extracted. The new bone will so closely invest the root that the tooth may even appear more solidly fixed in its socket than before its removal. But the secondary formations which hold it in place will be more embryonal in their nature, and therefore more liable to degeneration, and any accident, any fortuitous condition which may induce a reversal of nutritive currents, would be likely to result in resorption, and the tooth would be lost in the very manner in which clinical experience has taught us is brought about its removal.

Discussion. *Dr. Thomas Fillebrown*, Boston: I consider the paper an excellent one, but it is along the same line that many writers of the present time follow—it deals largely in the realms of

imagination. This, however, is not intended as a criticism, for such is now the tendency of all our educational institutions—they are seeking to make all professional or scientific studies classical. I heard a student say recently that in a year's course of physiology he had not learned a single fact, nor received anything that would be of value to him in practice. The professor dealt wholly in theories—what some one or other thought. Still, that is in one sense in the right direction, and Dr. Barrett's paper points that way. It emphasizes the fact that dentists should obtain a broader knowledge, so that they may be able to treat the medical aspects of the questions arising in their practice and in society discussions. I have long felt humiliated by the practice of so many dentists in calling in some physician to anesthetize their patients. It is wise to call a consultation in certain doubtful cases or where there is ground for serious apprehension, but the man who is not fitted to treat all the conditions that may arise before, during or after these operations falls far short of being a well educated practitioner.

The paper is a correct statement of present knowledge on the subject of pyorrhea, but there is too much of a tendency to make it an incomprehensible disease, to assume that it is far above practical observations. We are apt to forget that this disease does not occur in one case in ten thousand unless we first have a local irritant. Of course, whether the growth is luxuriant or not depends upon the soil in which it is planted, and in this respect it may be a constitutional disease. A good constitution and healthy gums will resist all the bacteria of pyorrhea that can be put into any mouth, but where there is inflammation from local irritation, thickening the gum and offering a good chance for lodgment of foreign substances and fluids out of the circulation, germs have a splendid opportunity to work and they improve it.

Concerning the attachment of implanted teeth, I think Dr. Barrett's remarks are very good. The attaching membrane is no doubt pericementum. I think the essayist is right in regard to the appearance of an ankylosis, that it is a crowding in of the bony substance until the root is finally imbedded, a condition of gomphosis. I do not think the statement is correct that we never find a real assimilation between structures of a little different tissue. Cementum and dentin are certainly ankylosed thoroughly, and so are dentin and enamel. Now it is but a step between this and bone, and it seems

possible to me that there may be a union between them. The teeth of fishes which were alluded to seem to be almost an illustration. The essayist says they are projections from the jaw bone, but are they not also tipped with cementum?

Dr. Barrett: They are calcified, but are not tipped with cementum in those cases to which I referred.

Dr. Fillebrown: I am not quite clear on the subject to-day, but I think Tomes states that some species of sharks and other fishes have enamelled teeth attached by complete ankylosis.

Wherever a new membrane is produced, in the way the paper indicates, although its function is the same as that of the old, the new tissue is never one in structure, nor is its function perfect, for whenever trials come this is the first part which fails. Any man who has had a limb broken, where there has been thorough ankylosis and where new tissue has formed, knows very well that whenever the weather changes or he has to do a little extra work this limb is the first thing to give warning.

Dr. James Truman, Philadelphia: When I hear a professor of pathology state that bone and cementum are not homologous I wonder whether my histological work was ever correct. As I understand these tissues, cementum and bone are homologous, and whenever an increase of the cemental tissue occurs it takes upon itself an approximation to the systemic arrangement of the lacunae and canaliculi, exactly as in bone. Any one who has made sections of a tooth thus affected will find this to be true. How could it be otherwise? Are not the osteoblasts and cementoblasts analogically the same? Is there any practical difference between the functions of these cells in the formation of bone or cementum? It is stated that the cells in bone and cementum are unlike. This is another fallacy, for except perhaps in size they are exactly the same. The lacunae and canaliculi are exactly the same in cementum and bone, and any careful and skilled microscopist would not make such an error. I am opposed to such ideas being promulgated as statements of truth coming from this organization.

I have no sympathy with those who believe that pyorrhea is entirely constitutional. I recognize the fact, as a large majority of practitioners and investigators do, that it is a local disturbance, which has practically nothing to do with the gingivae. It belongs to the pericementum and is microbic in its origin. I believe there

are two classes of pyorrhea—one that may come in early or middle life, and the other the senile pyorrhea, which is the result of consolidation of teeth in old age. The first is curable and the last not. We must make this distinction and treat the disease practically. The treatment is a matter of great interest and must be along philosophical lines if we wish to accomplish anything. It is often said that pyorrhea is not curable. What is meant by that? After a physician had dismissed a patient who had had typhoid fever would he say that the latter was not cured because he could not guarantee that the disease would not return again at some future time? When pyorrhea, notwithstanding the constitutional conditions which may have been present, has been cured, it is very possible that the disease may return at some time. For years I have had this matter in charge at our clinic, and with rheumatic and gouty subjects, under unfavorable constitutional conditions, I have never hesitated to treat the cases locally, and in the majority of instances have cured them. It is curable by proper systematic treatment. If authors and essayists would go less into the etiology and more into the practical treatment of the disease their labors would be far more satisfactory.

Dr. S. H. Guilford, Philadelphia: When a tooth is implanted in a socket—in an artificially made alveolus—one is usually selected that is surrounded with pericementum, and in the earlier days implantation was not attempted unless the root was in that condition. When it was placed in the socket and held there for a certain time it became firm. Then the question arose, "How is it possible for a foreign substance to become firm under such conditions?" Different theories were advanced, and the most plausible one was, that a change takes place whereby the pericementum is removed and replaced by bony structure; in the same way, for instance, as the change which takes place in sponge-grafting. When we have a wound or lesion in the cheek a sterilized sponge is placed in the hole and properly protected, and we find that it is gradually removed and new tissue formed, so that in time normal tissue takes the place of the sponge and the space is filled up. Before this method was adopted an ugly cicatrix was formed when such an opening was closed, but under the new procedure it is found that the new tissue formed presents a much better appearance. So in implantation, just so soon as the tooth is placed in the artificial

socket a certain amount of irritation or stimulation takes place, the bone cells immediately begin to form new bone, and this action continues until it comes in contact with the naked tooth or with the cementum. The pericementum is gradually resorbed and carried away and this tissue is formed in its place, so that when the tooth becomes firm it is apparently in direct contact with the bony tissue. This is seemingly proven by the fact that an implanted tooth gives forth a sound different from that of any other tooth when it is tapped with an instrument, showing that in the one case there is an elastic membrane surrounding the tooth and that in the other there is not. Now, in the course of time the implanted tooth becomes loose, and when removed it is found that the root, cementum as well as dentin, has been extensively resorbed. In other words, nature has tolerated the tooth for a time just as she might some other foreign substance, and has then set up a destructive process by which it has been lost. Briefly, nature forms an attachment to support the new tooth for a time, but after awhile she sets up an entirely different process and the tooth drops out.

Dr. G. V. Black, Chicago: I wish to speak concerning the manner of attachment in implantation. First as regards bone and cementum—in fishes teeth are attached to the bone, but in none of the higher animals is this the case, nor do we find cementum and bone becoming united. That is the important factor in considering the lack of homology between these tissues. Cementum unites with cementum whenever the roots of the teeth come in contact. I had supposed that the attachment of implanted teeth was understood. There is a certain form of repair that always goes on when cementum is injured or absorbed and again repaired, which occurs very frequently, and a careful examination of sections of a few old teeth will give good illustrations of it. An absorption of cementum, for instance, or an injury occurs. If the latter, a slight absorption will take place and new cementum will be built into the absorbed area—either built upon the cementum or laid down upon the dentin if the absorption has gone into the latter. When a tooth is implanted the absorptive cells, or the remaining portions of the pericementum, or the connective tissue in case all pericementum has been destroyed, coming in contact with that cementum first begins an absorption and removal. Then a new pericementum is attached in the regular way, which is by the formation of fibres and

the laying down of cementum around the ends of same, so that they become attached. This is also true when we move teeth in regulating, the fibres are attached to the bone just as the periosteum is. The same thing occurs in implantation. This new pericementum is cicatricial to a degree, and it becomes exceedingly thin, which has led many to suppose that there is a bony attachment, but there is always a membrane between. It is exceedingly thin, and without proper section-cutting and careful microscopic examination we should never discover that there is any membrane present. Now, if the absorptive process occurs it will destroy the roots of the teeth, and this is what generally happens in the course of time, because these are very imperfect.

Dr. C. N. Peirce, Philadelphia: To satisfy myself that there was no bony attachment, and that the attachment was only through the thickening of the pericemental membrane, I felt that if I could cut a slot in the root of the tooth to be implanted I might more quickly get the attachment. So I implanted three teeth, cutting a slot clear through the middle of the roots a little more than a quarter of an inch long and as wide as it could be without disturbing the roots, extending it not quite to the apical foramen. I observed of course all the essential care previous to the implantation. I was surprised to see how quickly these teeth became firm in the sockets, but I was more surprised to note that the roots became absorbed in two years instead of five. Two of the teeth are now out and the third one probably is, although I have not seen it. When they dropped out the whole end of each root was gone, leaving little more than the crown. The slot gave a greater opportunity for absorption than as if the root had been perfect, and the attachment, as I stated, was entirely through the soft tissue.

Dr. E. C. French, Eau Claire, Wis.: I notice that all these histologists have laid great stress upon the cementum. Would the absorption of the root take place more rapidly where the cementum was removed, or is it absolutely necessary to preserve the cementum intact in implantation? Would there be any union between the dentin and the surrounding tissue if the cementum were removed from the root?

Dr. C. L. Hungerford, Kansas City, Mo.: Every one should know that the cementum of the tooth develops from what we call the pericemental membrane. Bony structures develop from what

we call the periosteum, and it is well recognized that infection between the periosteum and bone causes caries of the latter, and a destruction of the periosteum produces necrosis of the bone and a sloughing of the mass. If in the extraction of a tooth the pericemental membrane comes away so that there is no covering to the alveolar process, an abscess develops at that point and the cavity from which the tooth was extracted does not yield readily to treatment; in fact, weeks and months may pass before the overfolding edges of the periosteum come down and cover the whole. These facts being true, it necessarily follows that the union between an implanted or transplanted tooth and the alveolus cannot be of a true physiological character. Now, what other process does nature employ to tolerate foreign substances in the physical economy? She encysts them—she heaps up a mass of leucocytes around the portion when infection is taking place, in order to protect herself from that infection or from that foreign body, and she throws out an inflammatory exudate at that point which builds up a tissue that holds a foreign substance, like a bullet or an implanted tooth, mechanically in position. Now, in case the lymphatic system is healthy enough to take away the products of septicemia of a local character or the detrimental tissue, we find that the foreign body is tolerated for a considerable time, and in case a complete encystation takes place before infection occurs the implanted tooth may very probably be held in its position throughout life. However, it would be held there mechanically as a result of its encystment, just as a lead bullet would be that was imbedded in the flesh. Nature attempts to get rid of that, to make an exfoliation, and in so doing she throws an envelope about it, but while it remains it is still a foreign body having no connection with the economy. This seems to be the only rational and physiological basis upon which we can explain why teeth are sometimes held in the mouth, why absorption frequently takes place at the apical portion of the root, and why occasionally these teeth are thrown off en masse within a few days or weeks. The idea of extracting a tooth and expecting the periosteum to come away with it, and thinking that that periosteum will again become alive when it is put back in the mouth, is utterly contrary to any physiological law. It cannot be accomplished. When we extract a tooth it is settled forever that the periosteal membrane is detached from it, for the membrane has a stronger

attachment for the alveolar process than it has for the cementum, and it is left within the cavity of the alveolus when the tooth is taken out, except in cases of abscess when it is detached from both sides. From this point a retrograde process begins. The alveolus is torn down or absorbed, and from the other side the larger cells commence to build up bony tissue and eventually it becomes true periosteum.

Dr. Edmund Noyes, Chicago: Perhaps it is possible that a tooth may be removed from the mouth and be replanted so soon that it will be restored to its former healthy condition, and that both the pericementum and pulp will live. I will cite one case which is authenticated beyond a possibility of doubt. A little girl, eight or nine years old, while swinging struck her central incisor so hard against something that it was knocked out of her mouth onto the floor. She picked it up and thrust it into its socket immediately without assistance, saying nothing to anybody about what had happened, and the tooth remained in her mouth with the pulp alive until her death about thirty years afterward. There is no question about these facts, so I suggest that there is such a thing as the cure of such a wound in the same way that any other analogous wound might be healed, by the immediate union of the severed tissues. Probably the calcification of the root in this case was not completed when the accident occurred, and the wide open foramen made possible the reuniting of the pulp vessels.

Dr. E. A. Bogue, New York: I should like to have this case explained: A girl thirteen years old was sentenced to lose her bicuspids, and one of them was transplanted without unnecessary delay into the mouth of a woman about forty years old, and has now been there thirteen years. By what process is that tooth now held in position?

Dr. Black: I should say it was held there by the normal processes, as nearly as they could be made so.

Dr. Bogue: I had supposed that, but what are normal processes? Is there a circulation of blood between the lining membrane of the socket and the cementum, or is there simply a bony deposit and a thin membrane independent of the tooth? *Dr. Hungerford's* views explain more fully than is usually shown why both the root to be implanted and the socket should be thoroughly antisepticated.

Dr. Hungerford: I thought I had previously answered *Dr.*

Bogue's question. I do not know how any one looking at the gum or the tooth from the outside can tell the method of its attachment. It might be screwed in from beneath. I stated how it was possible for a tooth to remain perfectly solid if there were no infection, but I do not believe it is held there by physiological processes. Dr. Noyes spoke about a tooth being knocked out and replanted and remaining alive for thirty years. I am absolutely positive that it did not remain alive, although it may have remained in position throughout life. It may not have been discolored, but the pulp was dead after the attachment was broken. Sometimes in sponge-grafting we find that the blood vessels will throw their exudate into the sponge and that new tissue will be built into it as a medium whereby the parts can be raised up from the underlying tissue. Dr. Pierce spoke of drilling a little hole through the root. That would of course give a pocket into which serum would seep, and having no chance to be absorbed the latter would immediately commence to decompose. An evolution of gas would take place, and it would be a considerable factor in the loss of that tooth. Dr. Pierce's procedure would give a much worse condition than if the tooth were round and smooth and so could come in contact with the blood vessels and tissues surrounding it.

Dr. J. S. Marshall, Washington: To corroborate Dr. Noyes' statement I will relate a case in my own practice. I was once unfortunate enough in attempting to extract a lower first molar to grasp the second bicuspid in the upper portion of the jaws of the forceps, the accident being caused by the patient's uneasiness, and I extracted two teeth instead of one. The bicuspid was perfectly sound and I replaced it immediately. I watched that tooth for five years, and saw it last about two years ago, the accident having occurred about fifteen years before. When I tested the tooth with ice-water and cold water it gave the ordinary response of the living tooth, but to make the matter perfectly sure I used the galvanic current, which never failed in my hands in detecting the vitality of a living tooth, and I can say positively that the tooth was alive.

Dr. Barrett, closing discussion: It seems to me that Dr. Truman has confused homology and analogy, but they are quite distinct and differentiated. Bone and bone are homologous, but bone and cementum are not, although they may be analogous. Cementum and dentin are not homologous. The union of cementum with den-

tin has been alluded to, but there is no union of the two tissues. Both are laid down simultaneously, and there is a complete interlocking, which is one thing. You who have examined the tissues that remain see clearly the line of differentiation between each, where the one is interlocked with the other, and where the one is a sort of gomphosis into the other, but still the line of demarkation between them is plain.

ORGANIZATION OF THE DENTAL CORPS OF THE U. S. ARMY, WITH SUGGESTIONS UPON THE EDUCATIONAL REQUIREMENTS FOR MILITARY DENTAL PRACTICE.

BY JOHN S. MARSHALL, M.D., U. S. ARMY. READ BEFORE THE NATIONAL DENTAL ASSOCIATION, AT MILWAUKEE, AUG. 6-9, 1901.

Pursuant to an order issued by the Secretary of War, the Surgeon General of the U. S. Army convened in Washington Feb. 18, 1901, the members of the examining and supervising board of dental surgeons. These gentlemen had been previously appointed by the Surgeon General and approved by the Secretary of War, on the authority of the provisions of the army reorganization bill, which was passed on February 2, to have charge of the examination of the candidates who were seeking appointment as dental surgeons in the U. S. Army. Orders were thereupon issued to the Board to immediately formulate the plans for the examination, and to be prepared to receive the first class of candidates upon Feb. 25.

The Board after due deliberation presented to the Surgeon General the following plan: *First.* The candidate should be required to pass a satisfactory written and oral examination upon the following theoretical subjects, which form the curricula of the colleges that are members of the National Association of Dental Faculties, namely: Anatomy, Physiology, Histology, Physics, Metallurgy, Chemistry, Dental Anatomy and Physiology, Dental Materia Medica and Therapeutics, Dental Pathology and Bacteriology. Orthodontia, Oral Surgery, Operative and Prosthetic Dentistry. *Second.* They should prove to the satisfaction of the Board their ability to perform all of the usual dental operations and laboratory work by clinical tests upon patients furnished for that purpose. These tests consisted of—*Operative Dentistry:* 1. The examination and record of condition of mouth and teeth. 2. Preparation of cavities

with hand and engine instruments. 3. Instrumentation and technique. 4. Preparation and manipulation of filling materials. 5. Insertion of fillings. 6. Treatment and filling of root canals and preparation of root for pivot crown. 7. Manipulative technique in removal of calcareous deposits. 8. Application of rubber-dam, metallic separators, matrices, etc. 9. Diagnosis, prognosis, and treatment of oral diseases. 10. Care and sterilization of instruments and hands. *Prosthetic Dentistry*: 1. Impressions in plaster paris and modeling compound, casts, bite and articulation. 2. Construction of a denture in-vulcanite. 3. Construction of die and counter-die from model to completion, carving the endentulous model from a solid block of plaster paris. 4. Construction of swaged plate, with metal and rubber attachments, also two shell crowns (bicuspid and molar) and one Richmond crown. 5. Construction of interdental splints (Dunning and Kingsley).

An average of seventy-five per cent was required in *each* subject for the theoretical and eighty-five per cent for the practical examination. This was to make it certain that none but skillful operators would succeed in obtaining an appointment. In marking the papers, and in grading the operations on the teeth, the methods of treatment, and the prosthetic work, a rigid system was suggested so that every candidate would be graded according to his merit. This plan was approved by the Surgeon General and has been conscientiously carried out by the Board. These examinations covered just two weeks with each class, one week being devoted to the theoretical subjects and the other to the practical work. The patients which were furnished for the clinics came from the General Hospital, Washington Barracks and Fort Meyer; while many of the officers of the army on duty at the war department have been glad to avail themselves of this opportunity to have their teeth treated and put in a serviceable condition. By this system of examinations the Board felt sure that it would be able to weed out the ignorant and incompetent applicants, and believes it has succeeded in so doing.

We were assured at the outset by the Surgeon General that no political pressure from any source would be brought to bear upon our Board in favor of any candidate; but if there should be, our duty was to pass upon the professional fitness and aptitude of the candidate for the service, as required by the law which called our Board into existence, and our report would be final. There has

been some fault-finding by the friends of some few candidates who failed to pass these examinations, and the cry has been raised that the examinations were "too rigid," "too high," and "too medical," but this is really the highest compliment that could have been paid to the work of the Board.

The examinations of the Board have proved that those gentlemen who had been out of college for any considerable number of years generally failed in the theoretical examination, while those that had recently graduated failed in the practical examinations. The majority of those candidates who successfully passed the examination have been in practice from two to four years. These men as a rule took high standing in their practical work, and this is also an evidence that they had kept up with the studies of the theoretical department.

The results of these examinations are as follows: Number of candidates invited to take the examinations, 86. Declined to appear, 6. Failed to appear, 10. Total number examined, 70. Found qualified and approved, 19, or 27 1-7 per cent of the number examined. Physically disqualified, 8, or 11 3-7 per cent of the number examined. Fully examined and rejected, 3, or 4 2-7 per cent of the number examined. Failed in theoretical examination, 7, or 10 per cent of the number examined. Withdrew before completing theoretical examination, 33, or 47 1-7 per cent of the number examined. Average age of approved candidates, 27 2-12 years. Candidates examined who were graduates in both dentistry and medicine, 1. Number of persons appointed by the Surgeon General without examination by the Board, as provided for in the law, 5. Total number of dental surgeons now in the Army, including the three members of the Board, 27. Vacancies yet to be filled, probably in the Autumn, 3.

It will perhaps be interesting to know the states and territories from which these gentlemen came: Alabama, 1. California, 1. District of Columbia, 2. Iowa, 1. Maryland, 1. Massachusetts, 1. Missouri, 2. Montana, 1. Nebraska, 1. New Jersey, 1. New York, 1. Ohio, 1. Pennsylvania, 2. Washington, 1. West Virginia, 1. Wisconsin, 1.

The following is a complete list of the members of the Corps and their present stations. Members of the Board—John S. Marshall, President, Presidio, San Francisco, Cal. Robert T. Oliver, Recorder, Manila, Phillipine Islands. Robert W. Morgan, Member, Havana,

Cuba. Robert P. Updike, Fort Leavenworth, Kan. Edwin P. Tignor, Fort Riley, Kan. William H. Ware, Phillipine Islands. Hugo C. Rietz, Phillipine Islands. Ord M. Sorber, Fort Sam Huston, Tex. William C. Fisher, Fort Sheridan, Ill. John H. Hess, Millitary Academy, West Point. Ralph W. Waddell, Phillipine Islands. Seibert D. Boak, Phillipine Islands. Franklin F. Wing, Phillipine Islands. George M. Decker, Island of Cuba. Frank P. Stone, Phillipine Islands. Frank H. Wolven, Phillipine Islands. William H. Chalmers, Fort Monroe, Va. George L. Mason, Phillipine Islands. Clarence E. Lauderdale, Phillipine Islands. Jean C. Whinery, Phillipine Islands. Charles J. Long, Phillipine Islands. Hugh G. Voorhies, San Juan, Porto Rico. Appointed from the Army—Emmett J. Craig, Phillipine Islands. Samuel W. Hussey, Phillipine Islands. Charles A. Petre, Phillipine Islands. Douglas E. Foster, Phillipine Islands. Alden Carpenter, Phillipine Islands.

The Board, after being in continuous session for five and one-half months, from six to eight hours each day, and often being obliged to devote the greater part of its evenings to marking papers and other work pertaining to its official duties, finally adjourned sine die on July 31, 1901.

The examination of the candidates, however, was only a small part of the work that the Board found to do. It was early recognized in our deliberations that successful practical examinations could not be conducted except by the aid of a complete operating and laboratory outfit. We therefore recommended to the Surgeon General that two complete outfits be purchased at once and set up in suitable quarters for the use of the Board. This was immediately approved by the Surgeon General, and orders were issued by the Secretary of War, instructing the Board to proceed at once to Philadelphia and purchase such outfits. These were shipped and set up ready for use by the time that the first class had passed its theoretical examinations.

The next most important question in the organization of the corps was the selection of the general or field outfit. This was no insignificant undertaking, because it was exceedingly important in the selection of the furniture, instruments and supplies, that they be as light as possible, for the reason that transportation in an army is always a serious consideration. Consequently, the lighter the weight of the outfit the better from this standpoint. After the fur-

niture, instruments and supplies had been selected, it was necessary to have special chests devised to hold them, so that they would not be displaced or broken in transportation.

Each dental surgeon is furnished with one of these outfits, which contains all necessary instruments for operations on the teeth and sufficient supplies for a three months' service. It is so light that it can be carried upon the backs of two mules, together with an army field desk, two folding tables and two folding chairs. Another important question was that of preparing a nosological table for the use of the corps. The object in preparing this table was to secure uniformity and the same nomenclature in the register of dental operations and in the monthly returns. For the same reason a system of designating the teeth by numbers, of describing the location and the character of cavities of decay, the kind of filling material used, the nature and character of other operations, and the treatment of diseased teeth was designed by the use of letters and a combination of letters, which is so simple that any hospital corps private could master it in an hour or two of study.

These records if carefully kept will prove of great value after a few years in the study of the etiology of dental and oral diseases, and will also be of considerable value to the Pension Office in detecting fraudulent claims for pensions by reason of physical disability claimed to have been induced from the loss of teeth while serving in the army. These records will show every form of dental operation that is performed upon each officer and enlisted man, and every form of disease treated.

According to the provisions of the army reorganization bill, which incorporated the bill prepared by your committee on National Dental Legislation, the number of dental surgeons to be employed in the army was reduced to thirty. As a consequence of this the dental corps will be for a time at least the hardest worked branch of the medical service. Private letters received from those of the corps who have already reached their stations prove this statement to be true. One says: "There is more immediate dental service needed at this post than three men can perform in six months. I am working over hours to relieve the necessity." Another says: "I find plenty to do, more in fact, than I can do." The bill provides, however, that free dental service can be rendered only to the officers and enlisted men of the regular and volunteer armies. The

army regulations fix the hours of service at 9 A. M. to 4. P. M. During these hours the dental surgeon is expected to devote his entire time and attention to the care of those persons who are entitled by law to his services, except in cases of emergency, but after these hours he may attend civilian attachés and others who may request treatment, and for this he is permitted to charge a regular fee. He is, however, required by a special rule of the Surgeon General to state upon the monthly returns how many civilian attachés he has treated during each month. This was thought to be necessary as a check upon the temptation to neglect regular duty for that which would pay better in dollars and cents. There will be many opportunities of this kind presented, and to one who is not afraid of work a considerable sum may be earned during the year, enough to increase the income to a figure commensurate with the dignity of a professional calling. The hours for regular service are so fixed that the dental surgeon will have at least two hours each day that he can devote to the treatment of the families of the officers and enlisted men. I believe, however, that if the corps becomes a permanent organization the courtesy of free dental service will be extended to them, just as it is now the case with medical and surgical treatment, and I am inclined to think that this would be better from the standpoint of the highest efficiency of the corps, and only a just concession to those who are ever ready to defend our country against a foreign foe, even at the cost of their lives; while their pay is so small in many instances that there is no possibility, with a family to feed, clothe and educate, of laying by anything for old age.

In closing this part of my communication I desire to say, that I have been assured by scores of officers of the regular army whom I have met in Washington that our corps will be most cordially welcomed wherever it may be sent, for there is dire need of its services, and this is especially true in Cuba, Porto Rico and the Philippines. We are also encouraged by these gentlemen to believe that it is only a question of time when the corps will be made permanent by giving its members commissions. It will be necessary, however, in my judgment, before commissions can be obtained to first prove two things, namely—Is the corps necessary to the health and efficiency of the army? And does it pay in dollars and cents? These will be the questions that must be answered to the satisfaction of Congress before any more legislation along this line can be expected. After

the Philippine Islands have been pacified and the war is really ended retrenchment in the expenses of maintaining the army and navy will come prominently before Congress. Sentiment for the soldier will by this time have disappeared, because of the fact that the volunteers who have friends in every community are now all at home, and there will no longer be any strong political influence brought to bear upon our senators and congressmen on behalf of the regulars. Cold facts will then be the only power that will move Congress to increase the expenses of maintaining any department of the army. We must convince Congress that our corps is not only necessary to the good health, and consequently to the efficiency of the army, but it must be shown that it pays; that from a financial standpoint it is a matter of economy; that by having dental surgeons in the army much loss of service from incapacity for duty, resulting from dental and oral diseases, and by reason of necessary leave, often of weeks, in order to have troublesome teeth treated and filled, will be prevented. When the balance-sheet is presented to Congress it must be shown to be in favor of the government, if the corps is to be made a permanent feature of our military establishment. This I trust we shall be able to do. We have been given a chance to prove ourselves a beneficent profession in an entirely new and untried field, with no precedents to guide or experience to warn us of the dangers in our pathway or of the obstacles to be overcome. But I believe that the young men who form the dental corps of the U. S. Army will prove themselves equal to the occasion and bring honor upon the profession to which they belong.

Suggestions Upon the Educational Requirements for Military Dental Practice. The army dental surgeon, by reason of his military surroundings and associations, and the isolated position in which he will often find himself professionally, will need to be broadly educated, and so expert in his calling that he will be capable of managing any case that may be presented to him for treatment. Many times he will be so placed, as for instance, at a remote post upon our western or southwestern frontier, in Cuba or the Philippines, that he can by no possibility obtain the aid of a suitable consultant or advisor; so he must rely entirely upon his own judgment and experience in conducting his cases. It therefore becomes necessary that his general education shall be upon broad lines and his professional knowledge as complete as possible upon every

department of dental practice. This should also include a good knowledge of general *Materia Medica* and Therapeutics, Physical Diagnosis, Urinary Analysis, and the general Principles of Surgery. This is necessary if the members of the dental corps are to fill their positions with credit to themselves and honor to the profession.

In considering the character and the scope of the examination of candidates for appointment as contract dental surgeons in the U. S. Army, the Examining Board took into account the special and peculiar conditions likely to obtain in military dental practice, and the adverse criticism which would be likely to come from our confreres, the army surgeons, if we passed incompetent men. The examinations in both the theoretical and the practical subjects were so outlined as to cover so far as possible every feature of dental practice, and those general medical and surgical subjects which are necessary to be known by one who must, when occasion requires, be able not only to prescribe constitutional remedies for the relief of those general conditions which are often present as existing causes or complications of dental and oral affections, or are associated with certain surgical diseases of the mouth and jaws; but must also be able, by conducting a physical diagnosis, to determine the condition of the heart and of the lungs, and by urinary analysis ascertain the condition of the kidneys, and thus determine if an anesthetic can with safety be administered; which anesthetics are indicated or contraindicated; whether or not a surgical operation can be made with any degree of safety to the life of the patient, and the best method to be pursued in the operation under consideration.

In fairness to the Board it should be said that the questions which have been submitted to the candidates have all been of an eminently practical nature, and so selected and presented as to test their general knowledge of each subject and their ability to apply this knowledge in a practical manner,

To prove this, let me say that the examination questions in general anatomy were confined to the bones, muscles, blood-vessels and nerves of the head, face and neck. In general physiology they were confined to the functions of digestion, of the circulation, of the nervous system, especially those of the cranial nerves and the vasomotor system, of the liver and of the kidneys. These physiological functions have all a more or less important bearing upon the normal and abnormal conditions of the teeth and of the oral cavity. The

questions in histology were confined to the origin and minute structure of the teeth, bones, oral mucous membrane, salivary glands, mucous glands, gums and the tongue.

In physics the questions were simply elementary and composed of the tables of the metric system, the principles of the lever, the the screw and the inclined plane; the divisions of matter, the methods of obtaining the specific gravity of various bodies, the differences between atomic and molecular weight, etc. The questions in metallurgy covered similar ground, namely, the classification of metals; the origin, preparation and physical characteristics of the metals employed in dental surgery; their specific gravity, atomic weight and fusing point. The making of dental alloys, solders and gold plate of various carats. The value of platinum, silver and copper as alloys in making gold plate for dental purposes. The principles governing the use of fluxes in melting metals and in soldering, etc. In chemistry the questions were also largely of an elementary character, dealing with those substances chiefly employed in dental surgery, with usually one or two questions on organic chemistry and analysis either of the saliva or of the urine.

In dental anatomy and physiology, dental materia medica and therapeutics, dental pathology and bacteriology, orthodontia, oral surgery, operative and prosthetic dentistry, the questions were comprehensive and searching and intended to thoroughly test their theoretical knowledge of these subjects. The practical examinations in operative dentistry were conducted in an operating room with all the conveniences in furniture, apparatus and instruments that are to be found in a first-class dental office, while the practical examinations in prosthetic dentistry were conducted under equally favorable circumstances.

A less rigid and searching examination than this the Board felt ought not to be expected; in fact, the dignity and honor of our specialty, and the future high standing and efficiency of the army dental corps, demanded that the examinations be as rigid and as thorough as the courses of instruction in our best dental colleges would make practicable. The members of the dental corps will naturally be compared in general education and professional attainments with their brethren of the medical corps, and it is to be hoped that in this comparison those of the same age and experience will make a favorable showing.

In order to stimulate the members of the corps to be studious and progressive, a system of examinations and promotions should be established, and doubtless will be, so soon as the value of the corps as a promotor of the health and efficiency of the soldier as a fighting machine is proved. In order to accomplish this the corps must be commissioned and a sufficient number of higher grades established to make the prize worth working for.

The results of the examinations of our Board have shown very conclusively that we need to spend more time upon the theoretical subjects of the curriculum than we are now doing, if we would thoroughly prepare our graduates for army dental practice. This was shown by the fact that nearly all the candidates who failed in their examination were deficient in those subjects which are classed as the fundamentals, and of these the majority failed in anatomy, physiology, histology, physics, metallurgy, chemistry, dental materia medica, therapeutics, dental pathology and bacteriology, and the principles of surgery.

Please do not misunderstand me upon this point, for I make no criticism upon our system of technical teaching, nor would I suggest that one hour less time be spent upon the practical subjects of the curriculum, but I would urge that more time be devoted to laying the foundations of a broad and comprehensive scientific education. This is just as necessary to a successful practice as it is to be an expert finger-craftsman. The dental surgeon who knows little or nothing of the sciences upon which his profession is founded cannot by any just claim ask to be classed as a professional man. If he has only finger-craft ability he is nothing more or less than an artisan.

This is a practical age and we are a practical people. Our young men and women as a rule chafe under any system of education which does not fit them to earn a livelihood by the time they reach their majority, and this is particularly true in medicine and dentistry. The evil which underlies all this is the ambition to obtain wealth and position by the shortest possible route, regardless of all other considerations. As a result young men in great numbers, with little or no suitable qualifications for a professional life, constantly clamor for admission to our medical and dental colleges, much to the detriment of the high standing of our profession and of our colleges, for the temptation is very strong when there is a

deficit in the college treasury to wink at the meager qualifications possessed by the applicants for admission, and trust to the future to correct this deficiency. Occasionally our confidence in these individuals is rewarded, but more often we are woefully disappointed in them.

Candidates have presented themselves before our Board who were unable to write a sentence of twenty words without misspelling at least one-fourth of them. This is no exaggeration, but a plain statement of facts. Many could neither speak or write without transgressing many of the rules of English grammar. We, however, are not alone in this, for the Army Medical Boards now in session are having the same class of candidates come before them. I need not say that such men did not succeed in passing the examinations of the Army Dental Board, for they generally gave up the attempt after trying two or three subjects.

The result of these examinations, it would seem to me, prove very conclusively that there is great need of raising the standard of the entrance requirements of our dental colleges, and of lengthening the course of instruction to four years, so as to be able to devote more time to the theoretical teaching. Our motto in dental education should therefore be "Excelsior."

Discussion. *Dr. B. Holly Smith*, Baltimore: It seems to me very appropriate that the president of this Association should have invited the chairman of this army examining board to present to us a record of the work which has been done. Some years ago the presidents of the various universities of this country met in conference, and the president of the Chicago University stated that it was well for the east and west to confer as to methods, etc. The president of Yale said that reminded him of a moose story. Some years ago, when the moose was almost an extinct animal in the east, a man possessing a live one went through the towns of New England exhibiting it. The admission fee was ten cents, and for families twenty-five cents. One day a man with a wife and eleven children came to the show and passed over his quarter. The exhibitor looked somewhat surprised and asked if the entire aggregation belonged to the one man. Upon being informed that it did he handed back the twenty-five cents to the father and said, "Walk in. It is just as important that my moose should see your family as that your family should see my moose." Now, I claim that it is

just as important that Dr. Marshall should be in possession of our views as that we should know his. Without criticising him at all, as I have the highest confidence in his good judgment and ability, I think the examination has been a very trying one. Invariably those men who have taken it have afterwards presented evidences of physical disability. The board may have thought this was necessary, but I should call it monstrous. I do not believe that the welfare of or the respect for American dentistry stands today upon the foundation of a knowledge of collateral branches. A dentist is respected when he is a man of honor and a capable practitioner of his own specialty. America leads the world today because of the initiative taken by her young men, not because of the broadening of their culture or their extended opportunities for learning. Enough men will be graduated from universities to protect the interests of dentistry along this line. Above all things a man should be in touch with the professional life of his community, and I therefore offer a resolution that the secretary of this Association be instructed to request the Surgeon-General not to accredit anyone as an applicant to this board for examination who has not the indorsement of his local or state society. The Surgeon-General assumes the responsibility of receiving the applications and nominating those persons who shall take the examination, and I am sure that he will accept our resolution as a respectful request. I believe it would have been better to have had a conference among examiners experienced along this line, so that the examination might have more nearly approached the usual form, and so that it might have been determined what was a fair and practical test.

Dr. Wms. Donnally, Washington: In justice to the Surgeon-General I must say that he is not responsible for all appointments, as in an informal conversation he asked me to say to the profession that his first and second choices were turned down by the Secretary of War, and that one appointment was thrust on him. Dr. Marshall states that there has been some fault-finding by the friends of a few candidates who failed to pass; and further, it has been charged that the examinations were too severe, too high, too medical, etc. We must expect this, but not be alarmed by it. It was the wish of the Surgeon-General, the board and the profession that only those men should be passed who were truly representative. I do not believe that the examinations have been too high from a dental

standpoint, but I do think that the examination has been "too medical." At the start Surgeon-General Sternberg stated that there must be a distinct line between the field of the army surgeon and that of the army dentist, and our greatest danger, in my opinion, is in extending into the province of the army surgeon to such an extent as to arouse antagonism and opposition. The dentist as he is in civil practice was declared essential to the army by those at the head of affairs. My idea was and is that the functions of the army dental surgeon should be described in general terms, and should be developed by experience rather than by aggressiveness at the start, always having respect for the limitations and for the well established lines that exist between medical and dental practice in civil life. Dr. Marshall stated that the board goes into the subject of general therapeutics and general surgery, to determine whether candidates are capable of treating certain constitutional conditions that will come under their observation. This implies the very thing that we thought it was necessary to avoid. All knowledge is valuable, but it would be just as essential to successful practice for the army dentist to know something of engineering. To require a dentist to know how to make analyses of urine in order to determine whether a patient can safely take an anesthetic is carrying theory a little too far. Such a practice is not carried out nor advised by either physicians or dentists in or out of the army.

Regarding the permanency of the corps, according to the idea that obtained in Congress, in the military committee, and in the mind of the Surgeon-General, this was an act of Congress based on the necessity of providing the army with dental surgeons, and it was not regarded in any sense as an experiment. Commissioned positions are not necessary to permanency. The hospital corps is not commissioned, yet it is permanent, and so the dental corps is permanent.

Some men have complained that so soon as they failed to make seventy-five per cent in such subjects as physics and chemistry they were shut out and not given an opportunity to take an examination on those things which are regarded as essentially dental. The requirements regarded as most essential in practice came later in the examination, those which must be regarded as collateral coming first, yet Dr. Marshall reports that only three of all those candidates examined failed in the former subjects. Now, if it is right that the

army dentist shall be required to pass an examination different from the requirements of any state board of examiners or of any reputable dental college, the law should be changed to make such action legal, but if it is not right the board should be guided by the law as it stands.

I make these criticisms without feeling, except an intense interest for the good of the cause, a cause which has taken much of my time and attention for the past few years. I hope to see every worthy man in the corps succeed, not alone for himself, but for the sake of the profession and the welfare of the army. I want him to demonstrate that we can accomplish all we have promised to do for the army, and I trust to see him help reduce the pension list. I wish to see him demonstrate that he is absolutely necessary to the treatment of certain diseases, but he must do so as an educated dentist, to the credit of dentistry, and not under a pretense made for him which discredits dentistry and the dental profession.

Dr. James Truman, Philadelphia: I heard with regret that part of Dr. Marshall's paper wherein he criticises the education of those who came up before the examining board. He speaks of spelling and grammatical construction as indicative of education or the lack of it. Now, all educators know that spelling is not a proper test of a man's education, for there are many individuals who can spell under ordinary circumstances and when not mentally disturbed, but in an examination they cannot think of words, spelling or grammatical construction. Furthermore, many cultivated college-bred people cannot spell correctly. I trust Dr. Marshall will eliminate that portion of his paper before it is published, for as the matter now stands it will go out to the world that a large proportion of the dentists in this country are uneducated men.

Dr. R. T. Oliver, Washington: As a member of the board I would say there were fifteen subjects for examination, and we figured each man's standing after he had completed a group of three. If he fell below fifty-five per cent we concluded it was hardly possible for him to reach the requisite seventy-five per cent by an oral examination. If his written and oral examination on these three subjects was low the fact was stated to him, and if his rating was below the required percentage it was suggested that he withdraw. This was done so that the young men might avoid the expense which they would incur by remaining the two weeks which it would

take to give them a final rating. If a man passed on the first three subjects the next three were given him; and so on. Every one who was given this permission to withdraw thanked us for the consideration. Let me mention some other points.

Dr. W. C. Barrett, Buffalo: Mr. President, am I not correct in believing that the most of us care very little for the details of this business, being satisfied with the general results?

Dr. Oliver: Just a word in conclusion. Those subjects which seemed to pertain to the practice of medicine were in reality fundamental to dentistry, and the examination was conducted on a high standard because we felt that the dental surgeon in the army should have a standing in his profession equal to that of the medical men in theirs or to that of the field officers in theirs, so as to put them on an equal plane if possible. I did not know that the law defined the standard.

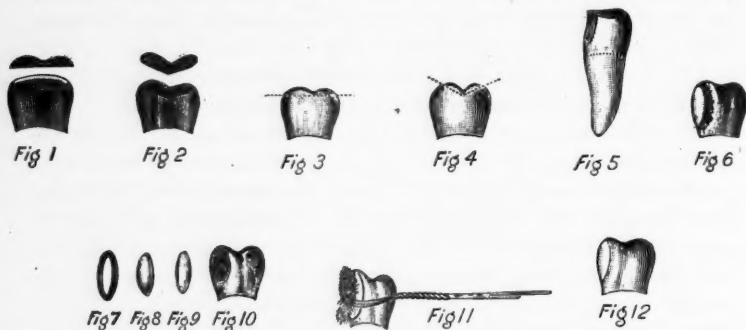
Dr. Donnally: As you have been operating under it for six months I suppose you knew what the law was.

Dr. Marshall, closing discussion: I cannot see any reason for all this talk about the work of our board. When the board first organized we determined that our first duty was to protect the honor and dignity of the profession, and our second was to see that no incompetent men got into the dental corps. This is what the law authorized and what you expected us to do. To the best of our ability we have tried to do what we thought was right, and when some of you get cooled off I believe you will admit it.

GUSTATORY SENSATION.—Before the Academie des Sciences Toulouse and Vaschide (*Intern. Centr. fur Laryngol*) reported the results of some investigations. They found that various portions of the buccal mucous membrane possess the sense of taste in varying degree. The lips, gums, cheek, floor of the mouth, can distinguish only acid tastes. Salty, sweet and bitter tastes are appreciated by the tongue and the faucial isthmus. The borders and upper surface of the tongue are more sensitive than the under surface, and the middle line of the upper surface is sensitive in a much higher degree than the lateral surfaces. The anterior third of the tongue is more sensitive to salty, sweet, and acid flavors, and the base appreciates those of a bitter quality. Probably the glossopharyngeus alone cares for the sense of taste, by direct supply from the hyoid bone and the faucial isthmus, and indirectly from the tip of the tongue through the lingualis and chorda tympani. Sensations of taste of an acid character in those regions not supplied by the glossopharyngeus are probably not pure gustatory sensations, but rather modifications of tactile sensibility.

Digests.

PORCELAIN VENEER FOR GOLD CROWN. By Henry Peach, D.D.S., Sydney, Australia. In the drawings of the bicuspid or molar cap which accompany this there will be found two special features which have not previously been pointed out. The first is in regard to the cusps, which by this method are deeper, more naturally shaped, and in which the articulation can be more accurately obtained, at the same time only sufficient gold being used to withstand the abrasion of mastication, a not insignificant factor when cost has to be kept in view. The second feature is that the surface presented to view—the buccal—is of porcelain, but so thin



as to take up hardly any of the space within the cap, thus necessitating but little if any extra cutting of the tooth substance. At the same time it is so perfectly protected that fracture is almost impossible. In the bicuspid region especially, which is neither within nor entirely out of sight, this will be appreciated.

With the assistance of the diagrams I will endeavor to describe its construction. In regard to the cusps, Fig. 1 will illustrate the usual method of construction, which previous to affixing the cusps has a flat filed top, and Fig. 3 shows the short unnatural appearance resulting. Fig. 2 shows a band shaped up with perhaps a little more inward bend towards the occlusal end, and filed out with round side of the file mesio-distally into a deep groove, to fit which the cusps, after striking up in any shallow die-plate, are gently bent in the jaws of the hand-vise, soldered and cut down in the ordinary

way. Fig. 4 illustrates with what different result. It might be pointed out that the anatomical shape of the periphery of the dentin would seem to approve this method, as it does not then become necessary to cut deeply into that tissue, but only to partly denude it of enamel, thus rendering devitalization unnecessary. (See Fig. 5.)

The Porcelain Facing. Having mounted the cap on a piece of stick to permit handling, it is now freely cut away on the buccal surface with the flat portion of a gold file, leaving uncut a narrow band at the cervical margin, Fig. 10. A cuspid tooth is selected, mounted with shellac face downward on a piece of cork, reduced with the carborundum to a thin veneer of suitable size, and fitted to this cut surface. Fig. 8—Holding it in place with some wax within the cap, fill out any irregularities of its external edge also with wax, to obtain a perfect contour, as shown in heavy shading on Fig. 6. An impression is obtained in moldine, care being taken that the fusible metal-die when cast shall show well over the buccal cusp. On this a piece of 22k. gold, about 32 gauge, is struck up, completely covering the porcelain and extending half a line in every direction beyond it. This is trimmed and an opening made in its face of a size to expose a sufficient surface of porcelain. Fig. 7—A piece of No. 60 foil gold slightly larger than the base of the porcelain is prepared. Fig. 9—And all put in position—cap, foil, gold, porcelain, retainer. The facing is now covered with small piece of sheet asbestos and the whole wired in position. Fig. 11—And a little solder carefully flowed round joint of retainer, and completed as Fig. 12.—*Items, Sept., 1901.*

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GOLD CROWN, PERFECT FITTING. By Dr. H. Robin Adair, Atlanta, Ga. The gold crown has come to be such a common resource that too little attention is given to it as to fit and usefulness. To my mind the gold crown is the most abused class of work of the dentist, when in truth it should receive the most vigilant care and skill. The difficulty I find with all methods now in vogue is their extreme inaccuracy as to fit and articulation and the trouble of getting the stamped cusp soldered on the band at the right place. Again, the large quantity of cement required to hold crowns in position is an objection, as shown by Fig. 1. Lastly, it is next to impossible to keep the solder from getting on the inside of band, thus preventing what otherwise would be a fine fit. When

they are polished the joint between the cap and band is the weakest part (the polishing often leaves a hole at this joint), just where the strongest portion of crown should be. The ideal crown should be a close reproduction of the original tooth crown. The inside of crown should fit all sides of tooth from top to bottom. The articulation with the opposing tooth or teeth should be accurate. It should have a degree of strength and thickness to hold a bridge and resist the wear of mastication. To my mind none of the present methods of constructing crowns attains these ends.

Last summer it was my pleasure to make a tour of the East, visiting the offices of many of the most prominent dentists in the United States, among them Dr. George Evans, Dr. E. Parmly Brown and Drs. Shields and Jernigan. These gentlemen showed me every courtesy in explaining their methods, and I have tried to incorpo-



Fig 1



Fig 2



Fig 3



Fig 4

rate the results of my investigations in this crown. To add to my difficulties, I had learned the Evans method of setting crowns with gutta-percha, and had been convinced of its usefulness. A careful study of the figures used shows my method of construction better than a description. I take my measure and make a band to fit the remaining tooth structure from cervical border to grinding surface, no matter how small or broken down. I cut the band from 29 gauge pure gold, leaving it a little broader than usual. Before soldering I place on tooth and burnish it accurately to side of tooth. If tooth be beveled as in Fig. 3, I cut out a V-shaped piece from the occlusal end of band. Remove and solder band. Cut two or three slits down the grinding surface of band and burnish these over the top of the remaining crown as in Fig. 2. Now we have band fitting perfectly, even on occlusal surface of the root. With any of the cusp-forming methods, swage up a cap; be careful not to cut surplus off too close to cusp. I save a number of well defined extracted teeth, and selecting the one that approximates the tooth

I wish to crown, imbed it one-third in moldine and run a metal die, with which I swage my seamless cap out of 32 gauge pure gold. The seamless crown outfits can be used to make this cap. The cap is now placed on the banded tooth. The patient is directed to bite into cap and hold jaw closed. While cap and band are thus held in this position, burnish sides of cap to band. Remove together and solder through the hole on inside of crown. If contouring be necessary, the cap can be easily spread out before soldering.

Fig. 4 shows a badly broken down molar, and the method of construction.

Some dentists have advanced the idea of soldering on a flat top to band; others of cutting a hole in this flat top to solder through, but I believe I can make a crown by my method while they are soldering on this extra top.

The advantages of this crown may be enumerated as follows: 1st—The ease and speed with which a crown may be made and polished. 2d—The proper distribution of strength. 3d—Pure gold at cervical margin is non-irritant and may be burnished close to root at cervical margin. 4th—No solder inside band. 5th—The small quantity of cementing substance necessary to hold crown, thus relieving patient of the disagreeable odor that always is present from a large bulk of cement. 6th—Gutta-percha may be used to set. 7th—A strong abutment for a bridge. 8th—A perfect fitting crown. A trial of this method of construction will convince the mechanical dentist of its usefulness.—*Items, Sept., 1901.*

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INFANTILE THRUSH. Honey and borax is a time-honored remedy, but it is a poor one nevertheless, because the honey is liable to give rise to fermentation. A solution of borax in glycerin and water is much better. Still more efficacious is a solution of sodium hyposulphite or sodium sulphite, about 30 grn. to 6 dr. of water and 2 dr. of glycerin. This solution applied frequently and thoroughly, on a pledget of cotton, to the entire buccal mucous membrane, rarely—we might say never—fails to cure a case of thrush or parasitic stomatitis, no matter how severe, provided it is seen early enough. Another method proposed by a German physician is to make a little linen bag, fill it with cotton and boric acid, and add about $\frac{1}{2}$ grn. of saccharin. This is given to the child to suck, which it does readily on account of the sweetness of the mix-

ture. The boric acid is dissolved slowly and has a constant antiseptic effect on the *oidium albicans*. This method has the advantage of the child's not struggling against it, as it does frequently when attempts are made to cleanse its mouth. Should a severe case be seen at a period when ulcerations have formed, the application of silver nitrate, 10 grn. to the ounce, may become necessary. The application is not to be made to the entire mucous membrane, but to each spot separately. Besides this local treatment, the gastrointestinal canal must be looked after. Small doses of calcined magnesia are generally beneficial.—*Merck's Archives*.

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INFLAMMATORY DISTURBANCES DUE TO THE PRESENCE OF A FOREIGN BODY IN WHARTON'S DUCT. By Dr. F. J. Martinez Aguirre, Guayaquil, Ecuador. In 1898 a patient was referred to me by one of the dentists of this city with regard to a disease the cause of which he could not ascertain. The patient, a girl of eighteen years, had been complaining for a long time of acute pain in the region of the submaxillary gland, which increased during mastication, and gradually became so severe that it prevented her from eating. The submaxillary region was very much tumefied, and the skin over the gland presented a deep red coloration. As the teeth were in a perfectly healthy condition we were somewhat in the dark as to the cause of the disturbance. The floor of the mouth was the seat of acute inflammation; the submaxillary gland was very much swollen; the mucous membrane presented a deep red coloration, and the papillae of Wharton's duct projected about half an inch beyond the level of the surrounding tissues.

While examining the floor of the mouth I made slight pressure upon the tissues covering the duct, when I observed that a whitish fluid was exuding through the opening of the duct. I made more pressure, and, to my great surprise saw that not only more fluid, but also a pointed body was coming out through the opening of the gland. I then proceeded to extract the pointed body by means of an ordinary pair of pliers. The body thus extracted was a fragment of a toothpick, now covered with calcareous deposits, which the patient had introduced accidentally and unconsciously into the duct of the sublingual gland. I questioned her many times to ascertain how and when this strange accident had taken place, but unfortu-

nately she could not enlighten me on the matter, as she had no recollection whatever of its occurrence. After removal of the cause, and after the patient had used an antiseptic mouth-wash for a few days, the inflammation and pain subsided, and since that time she has not had any cause for complaint.—*Cosmos*, Aug., 1901.

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DECIDUOUS DENTITION AS A FACTOR IN THE HEALTH OF THE CHILD. W. H. Dolamore lays stress on the importance of caring for the first teeth. They should be cleaned thoroughly twice a day, and this habit cannot be begun too early. If an infant has only one tooth that tooth will be all the better for the cleansing. They should also be periodically inspected, and small holes when present should be filled. He assumes that the teeth are cut in an approximately perfect state. During the earlier stages of caries of the teeth the constitutional effects are slight, and perhaps transitory, though in a delicate child the pain on attempts at mastication may lead to a refusal to take any but the softest food, and this might possibly not be without its permanent effect. But caries is, almost without exception, progressive—not only leading to exposure of the pulp in a particular tooth, but spreading to other teeth, including those of the permanent series, owing to the acids formed by the decomposition of the food which collects in the cavities of decay. Moreover, although the vessels of the pulps of the temporary teeth do not become so quickly plugged, owing to the larger size of the apical foramina, as they do in permanent teeth, yet the septic inflammation, which must necessarily ensue when the pulp is exposed, will inevitably in time cause their death. The septic condition of the mouth now becomes worse, for to the previous factors there are added the breaking up of the gangrenous pulps and the collection of food in the pulp-canals where it remains free to decompose, unreached by the tongue or the ordinary cleansing processes, whether of the brush or the mastication of food or the drinking of fluid. Moreover, either by the direct spread of the inflammation or by the forcing of virulent septic organisms through the apical foramen by the piston action of a plug of food forced into the tooth cavity, acute inflammation in the surrounding tissues may directly follow. But even supposing this may fortunately not happen, the periosteum of such a tooth is almost always chronically inflamed, as is frequently seen when it is removed. Certainly, so

long as the pulp is not exposed, probably so long as an exposure does not lead to any extensive disease of it, no germs or germ products will be absorbed into the blood stream; but when the pulp is dead this inevitably happens to a greater or less degree.—*Lancet*.

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PERIODS OF STRESS AND THEIR DENTAL MARKS. By James G. Kiernan, M.D., Chicago. Read before the Am. Med. Assn., June, 1901. Despite embryologic teachings, that old notion that man alone is an entity who undergoes development still controls pathology and physiology. The human being, however, is a compound animal in whom organs have their own nervous system and their own life under control of the cerebrospinal system. The child is not an undeveloped man, but man is an imperfectly developed child. The embryo has to contend with retrogressive as well as progressive factors, and the same is true of man after birth. Vertebrate embryos are of common type at their origin and assume successively many common forms before definitely differentiating. The higher vertebrates contain in essence the organs and possibilities of all lower vertebrates. The human organism is therefore a balance. While the balance is maintained the organs work in unity, though there is a constant struggle for existence between them. During embryonic existence this struggle is more intense and diversified than after maturity, because of the influence of three contending forces: remote atavism or throw-back to primitive types, immediate atavism or throw-back to the less remote ancestors of the same type, and finally immediate heredity. Remote atavism tends to preserve structures which occur in the normal embryo only to disappear. The human heart passes through all vertebrate heart phases. This is likewise true of the teeth. During the life of the embryo the tooth system wavers at one time between the polyphyodont and the diphyodont. At this period, should the diphyodont tendency of man be arrested, the polyphyodont takes its place and the human being sheds teeth as do reptiles. On the other hand, should immediate atavism gain the ascendancy over remote atavism shown in polyphyodontia, diphyodontia occurs. When the struggle for existence between the two is keenest a period of stress results, which affects the organisms as a whole. This stress expresses itself most strongly in dental and maxillary irregularities, since the jaws and teeth are among the most variable structures in evolu-

tion. Under what is known as the law of economy of growth is governed the relation of the organs to each other, and the process whereby one structure is sacrificed for the development of another or for the development of the organism as a whole. Since certain parts in the evolution of organs disappear, and in the evolution of organisms certain organs through suppressive economy, and since the disappearing and developing tendency of necessity centers around the time when certain functions are to be lost by the disappearing and others gained by the developing, periods of stress occur around which the law of economy of growth centers the struggle for existence between parts of organs and between organs themselves. It is because of this that physiologic atrophies and hypertrophies and their reverses occur. Nearly all conditions of physiologic disturbance may result at these periods of stress under the influence of maternal environment or of hereditary factors. The fetus, therefore, must be prepared to pass through not only intra-uterine periods of stress, whose dental mark has already been indicated, but post-uterine periods as well.

The child has not attained its full development at the time of birth. It has within it certain potentialities, some of which are never fully realized. There is a constant struggle between the central nervous system and certain bodily functions for preservation of the individual and for preservation of the race, through which the central nervous system fails to reach the height indicated in the child. This struggle for existence after birth is keenest at certain periods, each of which is marked by dental phenomena. The first is the period of first dentition. Here, coincident with teething, the child is gaining its impressions of the outside world, is learning to walk and talk, and is also developing its eliminative organs, especially the rectum. These varied functions constitute a strain on the system, effects of which are most often evinced through the teeth and jaws. The conditions charged to teething are an expression of constitutional strain finding its outlet through the point of least resistance. During this first dentition the strain of development forces attention to the teeth, and thereby leads to neglect of other factors. The teeth at this period should be regarded as a meter of constitutional strain and not a cause of it. Within the next period, between 2 and 6, occurs the first great check to continued development of the brain. Man has learned to use his brain despite

this check, but had it not occurred he would have had a higher type of brain to use. Sometimes during this period the brain gains in size, albeit not in balance, at the expense of the general system. In no small degree the struggle for existence during this period of stress centers around the development and eruption of the first molar. With the eruption of this tooth premature puberty, sexual precocity, epilepsy, insanity, gout, rheumatism, obesity and other nutritive degeneracies may occur. All have been charged to the eruption of the first molar, whereas its irregular or difficult eruption is, like them, an expression of constitutional stress. Hygiene of the teeth at this period means also constitutional, mental and moral hygiene. Epilepsy, for example, is not a disease, but a symptom of weakness of certain vasomotor inhibitions. The first convulsion does not constitute epilepsy. Through a law of the nervous system, nerve action once roused tends to repeat itself. In this way are established normal and abnormal habits, of which last epilepsy is one. In its early stages a habit normal or abnormal is easily checked. The first convulsion, therefore, could be prevented were its premonitions known. A recurrence could also be prevented were the constitutional origin recognized. Observation of the general constitution at this time, because of irregular eruption of the molar, would enable the physician to nip epilepsy and many other allied conditions in the bud. Reflex notions, however, must be flung overboard. All irritations should be removed and any constitutional irregularity treated.

The obese child of 6 years, even though the obesity be not excessive, should be looked upon from a health standpoint with suspicion. There is liability to disease, and marked tendency to systemic weakness when under morbid influence. These children are particularly liable to rheumatism, gout, etc., and profuse hemorrhage from slight causes. Youthful obesity is sometimes associated with precocious maturity and resultant early senescence. More often it coexists with extended infantilism, as is the case of Dickens' "fat boy." E. S. Talbot, examining 267 corpulent school children and adolescents, found marked stigmata of degeneracy. Ninety-two per cent had deformed ears to a marked degree. Sixty-six per cent had arrested development, as compared with their age, while 12 per cent presented excessive development. Thirty-four were too young to determine the form and size of the jaw. In 33.5 per cent of the

34 the molars, incisors, cuspids and bicuspid were present. Ninety-six per cent of these had small teeth. Eighty-seven per cent (of the 233) had arrested development of the upper jaw; 22 per cent arrest of lower jaw. Sixty-four per cent had V-shaped or saddle-shaped arches, or their modification, and protruding teeth. Seventeen per cent had hypertrophy of the alveolar process. Eighty-three per cent had small teeth. Twenty-seven per cent had extra tubercles upon the molars. Eighty-two per cent had stenosis of the nasal cavity more or less marked. Thirty-six per cent had deflection of the nasal septum to the left and 29 per cent to the right. Twenty-one per cent wore glasses for eye defect. In 58 per cent there was enlargement of the thyroid gland, and in 7 per cent arrest of development of it. In 296 cases of early lipomatosis (180 male and 116 females) coming under my own observation there were 10 cryptorchids, 6 hypospadiacs and 3 cases of pseudo-hermaphroditism. Three females had infantile bifid uteri. Four had enlarged clitorides; in one of these the urethra perforated the clitoris, as in the female shrew. Of 40 girls who had reached 18 only 3 had menstruated normally. The others were amenorrheic or dysmenorrheic, or had neurotic storms during the period. There were 160 hebephreniacs among the number. Of these 120 had masturbated excessively. Ten had been nymphomaniac or satyriac, the sexual appetite having become completely extinct at 18. Fifty of the non-hebephreniacs never showed any signs of sexual appetite. Three of the hebephreniacs were sexual invert, while 80 practiced various perversities. Of the non-hebephreniacs 10 were cyclothymiacs, 30 had acute forms of insanity, 10 were epileptic and 15 hysteric. Thirteen had had chorea. Ninety-seven had difficulty in learning to speak and 30 always stuttered.

The appearance of the first permanent molar is therefore of great significance to stomatologist and sociologist alike. The mental and moral deficiencies usually present will interfere with proper care of the teeth particularly indicated in cases where such deficiencies occur. While the eye has received much attention as a sociologic guide the teeth and jaws have as a rule been much neglected, although of even more significance than the functional disorders of the eye.

The next important period of stress is practically that of the second dentition. Here there is a foreshadowing of the mental and

nervous phenomena of the following period of stress. Sexual development now frequently receives its initiative. What is true of neuropathic children earlier is true at this time of ordinary children, under conditions of stress. There is irregularity of disturbed sleep, irritability, apprehension, strange ideas, great sensitiveness to external impressions, high temperature, delirium, convulsions from slight causes, disagreeably anxious dreams, romancing, intense feeling, periodic headache, muscular twitching, capricious appetite and marked intolerance of stimulants and narcotics. The struggle for existence between the developing alimentary and other systems between the second and sixth year has produced effects which are most felt during the sixth and twelfth year. Provided this struggle is between normal limits, the average child does not incur permanent danger from it. If, however, from heredity, congenital defect or improper environment, development of the system does not proceed equably, strain results, which produces during this period not only the conditions already described, but the following as well: *Neuroses*—Convulsions, nervous laughs, nervous coughs, hiccoughs, renal, hepatic, gastric, vesical, genital, pulmonary, adeno-pathic, cardiac, metabolic, stuttering, "tics," neuralgia, neurasthenia, ecstasy, hysteria, chorea, epilepsy, somnambulism. *Psychic Types*—Hallucinations, anomalies of character, aberrant sentiments, love, jealousy, anger, obsessions or imperative concepts, pure, attended by impulsive acts, arson, suicide, homicide, alcoholism, theft, rape, non-criminal acts, night terrors, idiocy, imbecility, mania, acute confusional insanity, melancholia, transitory frenzy, stuporous insanity, stupor, katatonia, paranoia, cyclothymia.

These are apt to occur at this time as a reaction to temporary disturbances of health. The temperature at which psychic disturbances begin in a child is a fair index of its brain stability. Neuropathic children, on a very slight rise in temperature or even without it, are subject to attacks of unreasonable elevation, during which they are quite beside themselves, rushing about wildly, shouting, fighting, and without clear consciousness of their surroundings. With this last picture stomatologists are very familiar in children brought to them for care of the teeth. During this period such disturbances have to be taken into account in cases where maxillary and dental treatment and regulation are indicated.

The period of puberty should include the time from the appear-

ance of the menses or spermatozoa until the completion of the twenty-fifth year. The appearance of the third molar at this time marks human maturity, which was the reason that twenty-five was selected for the age of maturity by the code of Napoleon. During this period it is possible to correct dental and maxillary irregularities with benefit to the subject. Every one of the conditions enumerated is due to strain during the period between six and twelve and may appear. In addition there occurs a type of mental disorder called hebephrenia, or insanity of puberty, which is practically incurable after its development. This is an insanity peculiarly charged to cigaret-smoking, masturbation, overstudy, religious excitement, and "love," all of which are the expressions of the defects and not their cause. These subjects in the early stage of their psychosis peculiarly require tooth regulation. In some cases strain from the tooth irregularity may have sufficed to upset the unstable mental balance. The next great periods of stress in human life are those of the climacteric and of the senile period. The first is accompanied by the menopause in women and prostate change in men. The dental conditions marking these two periods of stress are generally involutional in character and require prothesis or treatment, not correction.—*Jour. Am. Med. Assn.*, July, 1901.

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TEETH. By Robert J. ("Bob") Burdette. Read before the California Dental Association, at Los Angeles, July 11, 1901. Man that is born of a woman is of little hair and no teeth when he is born, and sometimes it would be money in his pocket if he had less of either. As for his teeth, he hath recurring convulsions when he cuts them, successive toothaches so long as he hath them, and as the last one is coming through the first one is falling out; and he entereth the afternoon land of his days, a human machine, having a mouth full of porcelain teeth built upon a plate that is constructed to hold raspberry seeds, so that the last state of that man is worse than the first.

Even so, if he shall stand up in the glory of old age and say, "I am a true man," he is condemned out of his own mouth, for molar crieth unto incisor, "Thou liest in thy teeth." Happy is he if he possess the teeth that have the cheek—though not the nerve—thus to reproach him.

Much honored is any man to stand before this assembly; the rep-

representatives of a profession whose work, since the conventionalities of civilization have abolished the custom of scalping, stands at the head of all surgery. Like the sun-dial, your work marks only the smiling hours. The rest of us conceal our shortcomings; we hide our mistakes; we deny our infirmities; while you, oh, fearless, honest men, you glory in the display of your "false." This is, indeed, tooth in. I do not wonder that you groan. The rest of us groan when its tooth out.

Shakespeare, whose genius transcends mere human culture, could exalt the toothache and never lose a note of grandeur. In his words I glorify your profession, for

"Your desert speaks loud, and I should wrong it,
To lock it in the wards of covert bosom,
When it deserves, with characters of brass,
A fortified residence against the tooth of time."

You see, Shakespeare evidently knew nothing about gold filling. But he knew what toothache was. We have internal evidence for that. He recognized its grandeur of anguish, its titanic potentiality of pain. He used it as a simile for the deepest and most distracting throes of human agony and rage of grief. Shakespeare never treats the toothache lightly nor irreverently, after the shallow fashion of the every-day humorist. In "Much Ado About Nothing," when poor old Leonato is heart torn in an agony of grief and shame, bitterer than death, in the wildness of his rage and suffering, spurning the sympathy of his friends, he cries:

"I will be flesh and blood,
For there was never yet philosopher
That could endure the toothache patiently,
However they have writ the style of gods,
And made a push at chance and sufferance."

Shakespeare never repeats, therefore when thrice he uses the toothache as a figure of profoundest suffering that can rack mind and body we know with what reverence and gratitude this immortal man would have dedicated the greatest work of his pen to the California Dental Association.

Under the old Hebrew law, "If a man smite out his servant's tooth he shall let him go free, for the tooth's sake;" that was the value of a single tooth—the whole man.

Well may the dentist wear his crown of gold upon his patient's

teeth; for right royal is he in pedigree and fame. Whatever he does he does sublimely. When he harpoons a hysterical nerve to see if it be alive he leaves no doubt in the mind of the patient, the ears of the neighborhood, or the duty of the Recording Angel, that the nerve and the patient's organs of phonation are as much alive as they are sadly out of tune. We admire him as a calm and progressive corrector of human evils as we view him putting a gold filling in Mr. Bryan's wisdom tooth, or filling the mouth of a preacher with a rubber-dam—the only kind that preachers and dentists—I speak under correction of the dentist—are permitted to use. And that, too, is in keeping with the time, for theology of to-day is nothing if it be not elastic.

If you bring a brand new piece of humanity to the dentist, a dimpled baby, with the gummy, toothless grin of infantile happiness wrinkling its downy visage, it wakens no professional interest in him. It is too new. By and by, when there are repairs to be made, the mother brings the little one to the high chair behind the screen. Nature, and the physician, and the nurse, and the minister who christened the child, have all done their best. The little human machine has been fairly started on its seventy-year run, and it hasn't run ten miles before it must go to the repair shop. The higher the civilization the greater the strain upon the machine. Something to be braced; something gone awry that must be straightened; something gone so loose that it must be removed; civilization to be rebuked and nature to be corrected; and the dentist repairs and corrects the mistakes of nature and civilization, peaceably as he can, forcefully if he must. The more delicate the machine the more need of continuous repair. We must in all honesty and the highest appreciation exalt the repair shop.

And of all dental repairers on earth, the American stands not only at the head of the highest class, but he stands in a class alone—without competition outside of his own country. The highest praise ever accorded to the American dentist we heard in the cities of Europe last year. Some repairs were necessary in the mills which for many months had been grinding the vulcanite steaks of Italy, and fracturing the flinty relics of the stone age which the French people are taught to call bread. We found in a city of Switzerland a promising sign in blue and gold—"American Dentist." That was what we wanted. We climbed the stairs hand in

hand—nobody ever goes alone to a dentist's—whispering words of encouragement and cheer to each other. We entered the sanctuary. A man bearded to the eyes, saluted us in German. "Do you speak English?" I asked. "Nein," he replied. "Sprachen sie Deutsche?" "Nixie weeden," I said, and we left "the American dentist" waiting for customers who could speak German.

Much do I wonder that I, who should have been the star subject at the clinics, should appear before this learned body of professional men as an orator. For I am not a man in whom the dentists take delight, however much they may regard me as a curious and interesting study. I have no doubt that the thought which flashed into the mind as this speaker confronted you, whistling his words with painful effort through the waste spaces where the teeth used to be, many years ago—a mocking reproach to dental cunning and learning—was "an enemy hath done this thing." Yet I am not here to mock you.

I was about to say that it was not my fault that I do not smile down upon you in the glittering grace of hard finish porcelain. Like the woman in the Scripture, "who had suffered many things of many physicians, and had spent all that she had, and was nothing bettered, but rather grew worse," so I have writ my experience with the dentist. Each successive man to whom I went, praying for more teeth, not only refused to give me that for which I asked, but took away at least one of the teeth I had. Oh, some of the more hopeful ones tried.

I have carried misfit plates in my pocket where, as I moved about, I could hear them snarling and biting each other in professional jealousy. But gradually the verdict of united dentistry became unanimous; they said my mouth was not made right. It would not fit any plate that human skill and dental science could shape. I said that my mouth was made first and the plate should fit my mouth. They insisted, with many long and impressive words, that my mouth did not fit. One or two cheerful practitioners did offer to remove every tooth left, saying they could do something for me if they started in with an entire outfit. But this was so much like building a new barrel around an old bunghole that I hesitated. And for years I have gone up and down the land eating my bread in the sweat of my mouth, making my living with my degenerate jaws, counting my few remaining teeth every morning to see that

none had been captured or added to the death roll, for I knew that as the ranks of the Old Guard became thinned, there could be no recruit to take the place of the captured veteran.

And when in far-away Syria there came the request that I should deliver an address before the California State Dental Association, my entire household woke the echoes of the Jordan Valley with inextinguishable laughter. The very Arabs of the camp enjoyed the humor of it with unbroken sets of the pearliest teeth that ever lighted up a laugh. A little flame of wrath smouldered and flared, red and fitful, under my mirth. I said: "These dental Philistines—accent heavy on the Phil—they have shorn Samson of his locks; they have put out his eye-teeth; and now, when their hearts are merry in the house of Dagon, they say, 'Call for Samson that he may make us sport.' " And you may remember how excruciatingly funny Samson was. He brought down the house.

Ah, well; the dental excuse—good excuse—for my impossible mouth is a good one, whether it be valid or no. I, too, make frequent use of it. Whenever, after trying my best through a long evening of mirth to bring a smile to some hardened countenance in the audience, grim, stolid, inflexible, hopelessly stupid, incurably asinine, the fixed degeneration of clammy imbecility, I say: "The fault is not with me, nor of my oft-repeated jokes; it is the man; he is devoid of the sense of humor." And he grieves me no more.

This fun of ours is all in the family, oh, brother dentists, for I, am one with you and one of you. I, too, love a genial display of teeth, hand-made or natural; perfect in surface or showing the radiant gleams of costly filling. I, too, am a jawsmith. "But," says the critical and professional listener, "this speech of yours does not fit the subject." Oh, my brother, remember what you said about my mouth—your subject does not fit my speech.

* * *

LA GRIPPE: MULTIFISTULOUS ABSCESS OF THE ALVEOLAR PROCESS. By W. A. Mills, D.D.S., Baltimore. Read before Union Meeting of District of Columbia Dental Society and Maryland State Dental Association, 1901. Several months ago we read a paper entitled "La Grippe Odonto-Metastasis," in which were described some of the peculiar characteristics of the lesion, the most important point being that while the symptoms indicated a dying,

suppurating, or gangrenous pulp, all of the usual clinical signs were wanting. The teeth were tested and found to have living pulps, yet on recovery from la grippe were discovered to be devitalized.

Your attention is now called to another pathologic condition which has been attributed to the same malady. *Case 1.* Miss H., aged thirty, of nervo-bilio-lymphatic temperament, sought relief from what was thought to be an abscessed tooth. The subjective symptoms were as follows: While convalescing from an attack of la grippe which had involved the upper air passages and bronchial tubes, she became conscious of an increased sensitiveness of the left cheek just below the malar process, which she attributed to "a cold in the face." This continued for twenty-four hours, when it was followed by a throbbing, tearing, crushing and burning pain just beneath the antrum of Highmore, which lasted five or more days with increasing severity, when the mucous membranes surrounding the molar teeth became so greatly infiltrated that deglutition was almost impossible, while mastication was but little impeded. On the sixth day the abscess spontaneously opened, discharging quite a quantity of sweetish pus. Following this the patient partook of food, had a night's rest of undisturbed slumber, and early next morning called at the office.

On examining the oral cavity the following objective features were observed: The mucous membrane covering the alveolar process of the left superior maxilla, from the first bicuspid to the tuberosity, was bluish purple in color and looked like a collapsed bag, while the tissues of the fauces resembled a case of chronic naso-pharyngeal catarrh. Three large fistulous openings were found—two near the base of the palatal arch, one on either side of the septum of the second and third molars, and the third on the line of the same septum, but on the buccal surface, a little below the base of the floor of the antrum of Highmore. There was no elongation of the involved teeth, but little tenderness in closing the jaws or from concussion; only the teeth were slightly movable on lateral pressure. Thermal tests proved the teeth to be living. Two had never been filled—second and third molars; only the first molar contained a small alloy filling in its anterior approximal surface. All the teeth were free from any indication of phagedenic pericementitis or salivary calculus. There was no discharge of pus from

the nose or offensive odor from the breath. So far as could be learned, there was no trace of any syphilitic or tuberculous infection, either hereditary or otherwise, and the family history being well known, any such supposition was *nil*. On exploring the fistulæ, all were found to lead to a central cavity lying just beneath the base of the floor of the antrum of Highmore, extending longitudinally from above the apices of the roots of the second molar to the apices of the roots of the third molar, and laterally from the buccal to the palatal plates. A slight crackling was observed on pressure, but no destruction of either had taken place except at the seats of the fistulæ; the floor of the antrum of Highmore had not been penetrated, but the base could be plainly felt. No sequestrum was found; all the conditions indicated a common abscess of the cancellated structures of the alveolar process.

Case 2. Miss D., aged fifty, of bilio-nervo-lymphatic temperament, had all the symptoms as described in case No. 1, except that there was one fistula more, the fourth being situated in the gingival space of the first and second molars, one of which, the second molar, had been treated some time previously for phagedenic pericementitis.

Case 3. Miss C., aged thirty, of nervo-bilio-lymphatic temperament; all the symptoms simulating those of cases 1 and 2 up to the day she called at the office, just at the time the abscess was about to discharge. From the slightly infiltrated cheek no one would have supposed that the following conditions existed beneath: The three molars of the left superior maxilla were almost hidden from view by the greatly distended tissues, the tonsil and pharynx on the same side being also involved. The diseased membranes were of a bluish purple color, and looked as though on the eve of becoming gangrenous. The three points of threatened eruption resembled a fistula in actinomycosis, and when opened the lancet entered so deeply into the tissues that it was thought that the antrum of Highmore had been perforated, but such was not the case. Quite a quantity of cream-colored pus, streaked with blood, was discharged; it was odorless and free from calcium deposits. The teeth involved were slightly movable, but gave little pain on pressure or concussion. Like cases 1 and 2, all the fistulæ were found to lead to a central cavity, and were of similar shape.

All the cases were successfully treated with Oakland hydrogen

dioxid, using it in full strength as a mouth-wash, medicament, and for irrigating the abscess cavities; nothing else was deemed necessary, as by its chemic and mechanical action it sought out and separated the living from the devitalized tissues and their toxins, at the same time destroying the microorganism which caused the disease, converting the whole into an inert mass, leaving the surface walls of the abscess cavities, after flushing, stimulated and aseptic, and thereby promoting healthy granulations and a rapid restoration of the lost parts. Although the treatment was conservative, it was thought wise not to pack the abscess cavities with antiseptic gauze, etc., as recommended, because the remedy used prevented reinfection from any of the pathogenic organisms contained in the oral cavity. No constitutional remedies were given, as the patients were still under treatment by their physicians.

As all three cases were stricken while convalescing from the effects of la grippe, which had taken the type of nasal and bronchial irritations, it is believed that the origin of the abscesses was due to a combination of the Pfeiffer bacillus and staphylococcus pyogenes aureus, which entered the blood current through the mucous membrane of the antrum of Highmore, tonsil, or gum tissues; colonized in the cancellated structures of the alveolar process, and by their toxic effect so obstructed the process of normal assimilation and oxidation that a local inflammation was induced, causing the tissues to break down; and nature, in the effort to be rid of the noxious matter, set up a process of suppuration. [All three cases have visited the office since the reading of the paper. All the teeth involved were found to have living pulps, with the surrounding tissue normal.]

Dr. A. B. Conklin says, "Whatever impairs nutrition, with resulting functional perversion, will go to the ultimate structural changes and final dissolution." Dr. Howard S. Anders says, "La grippe in its symptomatic manifestations is the hysteria of epidemic disease. Its puzzling obscurities, unique development, grotesque variations, distressing complications and surprising sequelæ make it, paradoxically, a type of the atypic in the class of infectious diseases, as is its functional analogue among neuroses. No tissue seems too hidden, no structure too strong, no function too stable, no organ too resistant, no organism too robust to escape its Briarean grip.—*Cosmos*, Sept., 1901.

COMPARATIVE MEASUREMENTS OF NATURAL AND ARTIFICIAL TEETH. By Frank L. Platt, D.D.S. Read before the California State Dental Association, July, 1901. (*Pacific Dental Gazette*, Sept., 1901.) It has probably been the experience of most dentists that in all the sets of artificial teeth they have seen but very few so closely simulated the natural dental organs as to be even moderately deceptive even to the most casual observer. Many have doubtless answered very well the fundamental purpose for which they were made; many have improved to a certain degree the appearance of their wearers, but how few have even remotely approached what the truly conscientious dentist most desires for his patients, how few have restored so far as possible the functions of the lost natural teeth or the facial expression on which the individuality of every one so largely depends.

If these conditions exist and we are so far from perfection in this branch of our art, let us seek the causes for it and correct our imperfections. Comparisons are said to be odious, but sometimes they serve a useful purpose, and may do so in this instance. Did you ever stop to think how few of the people you know, who still retain their natural teeth, have regular teeth, set in even monotonous order in severely drawn lines which even smiling lips cannot make graceful, or teeth of uniform color from central incisors to second molars, or how few of the people you know who are wearing artificial teeth have any other style than those just mentioned, or have you ever stopped to think how unlike nature such teeth really are? If you have done so you know there is room for reform, and a crying demand for it, that the word art may be applied to prosthetic dentistry and not be a mockery, and that we may do work in this line beyond the reach of honest criticism.

In the Dental DIGEST for May there is an article by Dr. E. A. Royce of Chicago, entitled "Artistic Dentures," in which the author calls attention to the various shades of color of the natural teeth in each individual denture. That the color is an important factor in the production of good looking artificial dentures no one will deny, and it will pay any dentist to read the article quoted. But there is another feature of artificial teeth to be considered, equally as important as their color from an esthetic standpoint, and of vastly more importance when viewed from the standpoints of restoration of the functions of mastication, articulation and facial expression. It is

to bring this matter to your attention that a number of comparative measurements of natural and artificial teeth have been made, the measurements being taken from plaster models of the natural teeth and artificial dentures in actual use. The length of all the teeth was taken both of the lingual and labial or buccal surfaces from the gum line to the tip of the longest cusps or incisive edges; the greatest width of the teeth on the labial and buccal surfaces; the masticating surfaces of the bicusps and molars mesio-distally and linguo-buccally, and the length of the cusps of the molars and bicusps.

It was found that the length of the artificial teeth on the labial and buccal surfaces compared favorably with the natural teeth, the artificial teeth being in most cases only slightly longer than the natural teeth, a result probably arising from an effort to have the artificial gum show as little as possible. The width of the artificial centrals, laterals and cusps also compared favorably with the natural teeth; but the artificial bicusps and molars were found to be sadly lacking in this direction. The average width of the upper natural first and second bicusps being 6.1 m.m., and of the artificial bicusps 5.5 m.m., over .6 m.m. less than the natural teeth; of the natural first molars 9.8 m.m., and of the artificial first molars 8.5 m.m., a difference of 1.3 m.m.; of the natural second molars 8.3 m.m., and of the artificial second molars 7.5 m.m., a difference of .8 m.m., the length of this portion of the arch of the artificial teeth being 2.7 m.m. less than the natural teeth. Not a very great difference, but still one for which in the majority of cases there is no necessity. The lower teeth show a greater difference, particularly so far as the molars are concerned; the average width of the lower first natural molar being 10.6 m.m., of its artificial substitute 8.5 m.m.; of the natural lower second molar 10.3 m.m., and of the artificial tooth 7.2 m.m.

It is in measuring the masticating surfaces and length of cusps of molars and bicusps and the lingual length of all the teeth that the greatest variation between nature and so-called art is discovered. The average length and width of the masticating surface of the natural upper bicusps is 5.8 m.m., of the artificial bicusps 5 m.m., a difference of nearly 25 per cent in masticating surface in favor of the natural teeth; the lower bicusps showing a difference in favor of the natural teeth of over 30 per cent. There is a differ-

ence of 30 per cent in favor of the natural first molars and of over 30 per cent in favor of the natural second molars. With the lower bicuspid and molars the difference is still greater, the masticating surface of the artificial teeth being from 40 to 50 per cent less than that of the natural teeth. The cusps of the artificial teeth are fully 50 per cent shorter than the cusps of the natural teeth, and not sufficient care is given by the manufacturers to making artificial teeth of such shape as will secure even an approximation to natural occlusion.

The lingual length, or what we call the "bite," of the artificial centrals, laterals and cuspids, bears in the majority of cases practically no comparison with that of the natural teeth. The difference in every case being over 50 per cent in favor of the natural teeth, and in some cases examined the "bite" of the artificial teeth was only 20 per cent that of the average natural teeth; the difference being made up by thickness of vulcanite.

Of course allowances have to be made for the thickness of the material from which the plates are made and the shrinkage of the alveolar process. But there is no necessity for using such artificial teeth as will decrease the natural masticating surface of the bicuspid and molars from 30 to 50 per cent, the length of the cusps over 50 per cent, and the "bite" of the centrals, laterals and cuspids from 50 to 80 per cent. By using such teeth the utility of the artificial denture is certainly impaired, the function of speech interfered with, and the esthetic possibilities of prosthetic dentistry greatly lessened.

I am told by our dealers that such teeth as would seem to be indicated by the comparisons noted—teeth with long bites, sharp, well defined cusps and large masticating surfaces are manufactured, but not kept in stock, from lack of a demand for them. If this is a fact and there is such an expression of opinion here as will indicate a demand for such teeth, and teeth of varying shades of color in each set, in place of the mere blunt pegs of porcelain, whose only merit lies in the shape of their labial surfaces, color not considered, which we are compelled to buy to-day, let us so express that demand that manufacturers and dealers will be forced to supply us with artificial teeth artistic in appearance and natural and serviceable in form.

Natural Teeth	Lingual Length.	Labial Length.	Labial Width.	Masticating Width.	Masticating Length	Length of Cusps.	Lingual Length.	Labial Length.	Labial Width.	Masticating Width.	Masticating Length	Length of Cusps.
Central Incisors.....	8.2	9.6	8				8.2	8.5	5.4			
Lateral Incisors.....	9.7	8.3	6.8				8	8	6			
Cuspids.....	8.9	9	7.8				9.2	10	7.1			
First Bicuspids.....	5.7	7.1	6.1	5.8	5.8	1.4	4.7	8	6.5	4.5	6	1.8
Second Bicuspids.....	5.5	6.2	6.1	5.7	5.7	1.4	5.6	7.1	6.6	5.1	6.6	1.8
First Molars.....	6	6.7	9.8	7.4	9.6	1.6	6.5	6	10.6	7.1	10.2	1.7
Second Molars.....	4.8	5.6	8.3	6.3	7.8	1.4	5	5.5	10.3	6.6	9.6	1.8
UPPER												
LOWER												
Central Incisors.....	5	10	7.5				3.8	6.2	4			
Labial Incisors.....	4.5	10	6				3.8	6.2	4.2			
Cuspids.....	5	12	7.5				4	7.2	5			
First Bicuspids.....	3	10	5.5	5		.7	2	6	4.5	4		.5
Second Bicuspids.....	2.5	8	5.5	5.5		.7	2	6	5	4	4	.5
First Molars.....	2.5	6.5	8	5.6	8	.8	2.1	4.2	8.5	5.5	6.5	.4
Second Molars.....	2	5	7.5	5	6.8	.6	2.1	4	7.2	5	6	.4
UPPER												
LOWER												

Measurements and Millimeters.

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ORAL NEUROSES.—The conditions described under this head by Goodale are divided by him into the following: 1, herpes zoster. 2, herpes buccalis and lingualis; herpes facialis; erythema exudativum multiforme, or bullosum; 3, erythema nodosum; purpura rheumatica; 4, stomatitis neurotica chronica of Jacobi; 5, dermatitis herpetiformis of Duhring (of doubtful position); 6, pemphigus. Of the above conditions the herpes forms, erythema nodosum and purpura rheumatica are all defined clearly, but with the erythema bullosum, dermatitis herpetiformis and stomatitis neurotica chronica much confusion exists. Erythema bullosum is an angioneurotic inflammation, generally afebrile, is characterized by eruptions of one or more vesicles upon a hyperemic basis, without characteristic grouping, enlarging rapidly by peripheral extension; it forms bullæ of one or two centimeters in diameter, the contents of which are at first clear, later cloudy, and evacuated by maceration and rupture of their epithelial covering, leaving a moderately sore, but not spontaneously painful base, which heals in from one to four weeks without a scar. Dermatitis herpetiformis is a chronic, probably infec-

tious condition characterized by more or less general eruption upon the skin and mucous membrane of lesions of multiform type, with pronounced burning or itching sensations, and having a protracted course with temporary exacerbations and remissions, and little existing disturbance. Stomatitis neurotica chronica is a chronic, afebrile affection, occurring generally in neurasthenics, and characterized by more or less general outbreak of bullæ upon the oral and lingual mucous membrane, preceded at times by local reddening, somewhat painful, not pruritic, and various symptoms of nervous disturbance. Pemphigus is a term applied to various forms, probably infectious and distinct, but differing in their etiology and having a common characteristic eruption of clear non-purulent bullæ on an unreddened or very slightly reddened skin or mucous membrane, in regular sequence, without angiogenic form, characteristic grouping, distribution or localization, with little or no local subjective symptoms and having an acute onset and tendency to recurrence and generally attended with marked disturbance of the general health. These characteristics given above may be regarded as representative type forms, but another source of confusion is the various meanings attached to the term herpes, pemphigus, etc.—*Jour. Am. Med. Assn.*

PALATE AND INSANITY.—The investigations of Dr. Talbot went to show that the high palate and insanity were nearly allied. Dr. Pope, of Leicester, does not bear out this view, as in a recent paper to the *Lancet* he says—“The shape of the palate has great prominence given to it, and I have consequently made a good many observations with regard to it. The committee state that it has a high pathological correlation. I found in 80 cases of mental defect that the palate had a high arch in 34, it was doubtfully high in eight, and was normal in 38. This does not seem a high percentage, and in the seven cases which I report fully, which were selected on quite other grounds and in which I had not specially noticed the condition of the palate, I found five to be normal, one doubtful, and one high. A diagnostic sign which misses five out of seven is not worth much. I thought it worth while, having the opportunity, to ascertain if this sign were absent from children admittedly not defective, at all events as to their capacity for learning, and I therefore examined 500 children in the fifth, sixth and seventh standards in the Leicester schools. I found in some of the higher standards examples of the most deformed palates—high-arch, V-shaped, and asymmetrical; and the totals worked out: examined 500, with the high-arched palate 135. Thus showing that half as many in proportion of the brightest children had high palates as the defective ones.”

Letters.

AN INFORMAL MEETING OF THE ODONTOLOGICO-STOMATITICAL SOCIETY.

(As told by the office boy.)

As I was a-startin' to Go Home one Evenin' the Boss says to me, says he, "James, they's to be a Meetin' of the Odontologicostomatitital Society here, this Evenin', an' if you'll Come an' Tend Door I'll give you a Extry Quarter, and you Kin Have what's left in the Way of Ice Cream an' so on. Kin you do it?"

I suppose I looked kind o' Groggy or somethin', for he said, right away, "it ain't no Buoyconstructor, James, nor Nothin' you need be Afeard of; it's only our Dental Society." But it wasn't 'cause I was Afeard; the Truth of the Matter was, me an' Dock Peabody's Offis Boy, that's acrost the Street, was a-goin' to the The-aye-ter that Evenin', to see Tim Punker in "The Pride of the Bowery," the play where the Heroine gits Dragged acrost the Stage by three Vilyuns, an' she Cries out in a Suffocatin' Vois, 'Save me, Oh Tim Save me!' An' Tim he Comes Rushin' out an' he Ketches the Fellers an' Slings them over the Fire Ingein House, an' Serves them Right! So thinks I, shall I or shall I not? for the Boss hasn't Said a Word about the Seventeen Dolars back wages due me, an' I seen here a Chance to Learn him a Lesson. But after a Bit thinks I, with Everybody imposin' on him I ain't got the Heart to remind him agin, so says I, 'all right Sir, I'll come,' " an' he says. "They ain't a-goin to be no Dry Discussions, James, only Eatin' an' Drinkin,' with a few Funny Stories, like as not."

So after Supper I come back, an' about Eight O'clock the dentists begun to Come. Among the First was Dock Puffy, that they say makes Twenty-Five Thousand Dolars a Year. Knowin' that the Boss didn't make no Twenty-Five Thousand Dolars in Fourteen Years, thinks I, I'll Inkwire into this Matter now, while I'm in the Notion. So I went out to the Kitchen where the Boss was helpin' Fry Doughnuts, an' makin' himself Gin'rally Useful, an' says I, "do you reckon it's True, what I've Heered, about Dock Puffy makin' Twenty-Five Thousand Dolars a Year?" The Boss he looked kind of Curious, an' Smiled very Broad, but he didn't Say Nothin', so I

winked my Eye an' looked kind o' Cute, an' says I, "Mebbe that's one o' them Funny Stories you Said I was Liable to Heer?" An' he said Right Away, it was. He said Dock Puffy didn't seem to Know it was Funny, an' that was what made it so Offul Funny. Says he, "James, any Dentist that sets about to Make that much Money in this Town inside a Year ain't a-goin' to have Much Time for Eatin' an' Sleepin', an' in my Opinion his Wife is a-goin' to Git his Life Insurance Money before the Year's up."

I ain't got the Least Idea what the Boss meant, but that's what he Said. Well, bimeby other Dentists Come in, among them Dock Hotty, what Tries to Let On like Dock Puffy ain't No great Shakes so Long as he's Around, an' he's Got a Automobile that cost Eight Hundred Dolars, but Dock Puffy says he's Goin' to Git one that costs Twelve Hundred Dolars, before long, an' it's the Latest Improved, an' the Other kinds ain't no Good. So Dock Hotty he set down beside Dock Puffy, an' them Two kind of Drawed Up their Cheers in a Little Circle all by Theirselves, an' never Paid no Attention to the rest. So presently in come Dock Measley, what has a Offis in the Parlor of Mis' Larkinses Boardin' house, an' the Boarders sets in his Offis waitin' for Dinner to Git Ready, an' they's a Livery Stable acrost the Alley, an' Hosses Stompin' off Flies, but Dock Measly he don't take no Back Talk from Nobody, even if he Ain't been practicin' only Two Years. So he Stuck Out his Hand to Dock Puffy, that Happened to be the Nearest, an' he didn't seem to Show him no more Respect than if he wasn't only a Common Dentist. An' he Whacked Dock Hotty on the Back, an' kind o' Tousled him around, drawin' him up by the Hand an' Sayin', "Why don't you Git Up when a Gentleman speaks to you, Cully?" An' Dock Hotty he blinked Offul Hard, an' says he, "Ain't you a Trifle Familiar, young man?" But Dock Measley he never paid no Attention, bein' so Took Up with Shakin' Hands all Round. So d'rectly he Set Down in the Middle of the Big Circle where they was all Settin', in the President's Cheer, an' he Pulled Out a Plug of Terbacker an' Cut Off a Chaw, an' says he, kind o' Cheerful an' Offhand, "How's Tricks, Fellies?"

Then he Slid Down in his Cheer an' stretched out his Legs, an' d'rectly he plunked a big Syringe of Juice over into the Boss's Waste Basket, setting right beside Dock Hotty. Everybody give a Little Jump at that, an' Dock Hotty he Sniffed, an' he Got Up an'

stood lookin' Hard at Dock Measley, but he didn't Say Nothin', only he Looked like he'd a Notion to Bite a Chunk out of him. Then Everybody turned Pale, an' stopped talkin', an' Dock Measley was the only on that stayed Perfectly Clam an' Composed. D'rectly says he: "What sort of a Quaker Meetin' is this here, anyhow?" An' then without waitin' for a Reply, says he, "Puffy, you an' Hotty come over to my Offis at Ten o'clock sharp, tomorrow, an' I'll give you some pointers on Irregularities. I Heer you two is Specially Interested in Irregularities. Well, this is a Dandy Case, an' you can't either of you Afford to miss it. I'll Look for you."

Dock Puffy he Let On Like he Didn't Heer, an' d'rectly Dock Hotty set Down agin beside Dock Puffy, an' them two Went On tellin' each other where they'd been all Summer. Both of them was Talkin' at once. Dock Hotty he was a-tellin' Dock Puffy how he'd been at Newport an' Watch Hill, at the Same Time Dock Puffy was tellin' him how he'd been in Yurrupe, an' Dock Hotty said he was Expectin' a Millionaire he'd met at Newport to come In an' have a Thousand Dolers worth of Work done, an' Dock Puffy he was Explainin' how they Wanted him to be Dean of a Dental College in London, an' Dock Hotty he'd Slept a Week in Rockafeller's Cottage, an' Dined with the Pierpont Morgans, an' Dock Puffy he'd been Cruisin' with the Royal Family a Month, an' King Edward he was so Offul Sorry Cause he couldn't Stay an' be his Dentist.

Dock Hoty he kind o' Gasped an' couldn't say No More then, but he set there Brethin' Hard, an' I seen the pace was too Hot for him, an' if it had been me that was Secondin' him, I wouldn't of let him Go Up for another Round. I guess he Seen himself it wouldn't Do, for in a Minute he kind of gave a Great Big Sniff, an' he Went acrost the Room an' Set Down with his Back facin' Dock Puffy, like he didn't Want to have Any More to Do with him. Then Dock Puffy he Took a Seat on the other side of the Room, an' he Commenced Talkin' about Educatin' the Public, with Dock Meedyum, that ain't either as High Up as some nor as Low down as others of the Dentists. He said the Public ought to be Trained so as they'd Understand the True Value of a Dentist's Services. Not that it made any Diffurunce to him, 'cause he could Git any Price he Ast. But Gin'rally Speakin' he thought Public Sentiment ought to Raise Up an' Insist on a Amendment bein' Made to the Consti-tooshun, debarrin' from Practis all Dentists that charges less than

Twelve Dolers a Hour for their Services. "In fact," says he, "if us older practitioners is to be recognized as the Standard, I'd make it Twenty-five Dollars a Hour."

He Looked Round Kind o' Fierce, an' Commandin', when he said that, an' young Dock Timrus settin' beside him, that Graduated at the Dental College lately, an' hasn't been Practicin' only a Few Months, turned Pale an' Got Up tremblin' like a Leaf, an' Snuck Out in the Hall. So Dock Measley he'd jist Come Over to Listen to what Dock Puffy was a sayin', an' says he, layin' his hand on Dock Puffy's shoulder an' blowin' a Mouthful o' Cigar Smoke in his Ear; "Puffy, let's me an' you go on to Washington an' Fix this matter up. I'll introduce you round, an' if your'e Afeard I'll do all the Talkin'. I'll tell 'em who you are, an' I'll assume all Responsibility. What say, Pard?"

Then Dock Puffy he Looked at Dock Measley, and if our School Teacher had ever of Looked at me thataway I'd of Knowed I was in for the Lambastinist Whalin' ever a boy Ketched. But it never Fazed Dock Measley, for he Set right Down on Dock Puffy's Knee, presently, an' begun Fumblin at his Watch Chain. So Dock Puffy he got Offul Red in the Face, an' in a Minute he kind of Edged sideways, an' Slipped out of the Cheer, leavin' Dock Measley perched on the Edge. Everybody Tittered at that, an' I seen it was Expected Dock Measley would look Combed Down, but he didn't Seem to be. Jist then I noticed him a lookin' Reel Stiddy at me, ('cause he Seen Me Lookin' so Stiddy at him, I reckon), an' then when I wasn't Expectin' Nothin', he made a most horrible Grimace at me, that Scairt me Haf to Death, 'cause it Seemed from the Way he kep' lookin' so Offul Solemn, never Smilin' nor Nothin', like as if it wasn't him Done it, but it jist Done itself. Dock Measley is the Most Mysterious Dentist I ever See. I don't see how he Dast do the things he Does to the Big Dentists.

Dock Puffy Come Back presently, an' he Kind of Sized Dock Measley Up, like he had Haf a Mind to Say Somethin', after All, But he didn't, an' jist then the Ice Cream an' Doughnuts was Brung In, an' Peace Rained, (like Henry Patrick said in the revolutionary War.) Bimeby you couldn't Heer hardly nothin' that was Said, for the Talkin' an Laffin' the Ice Cream seemin' to warm everybody Up so. But every Little While you could jist Ketch a Word or Two, here an' there. After a Bit I Heered Dock Hotty

say in a Loud Vois, "I don't never put on No Kind of a Crown for less than Forty Dolers." He was Talkin' to the Boss, but from the way he Looked Acrost to where Dock Puffy was standin', I Knowed he wanted him to Heer. Presently Dock Puffy said Reel Loud to Dock Meedyum, "Don't you Send me no more Cases o' Bridgework without they Kin Pay at Least Five Hundred Dolers," an' presently he Looked Over toward Dock Hotty, like he wanted him to Heer. But it seemed like Dock Hotty didn't Heer, but in a Little While he Looked Over toward Dock Puffy an' says he, 'I ain't Took less than Ten Dolers for a Amalgam Filling these Twenty Years.' An' you could Heer Dock Puffy finishing a Sentence at the Same Time:—"only Millionaire Patients; my Offis Girl is instructed not to Admit any others. I find I Kin make a Hundred an' Fifty Dolers a day off o' them kind, an' I Kin git along very good on that Mutch."

By this time it Seemed Like everybody was Ketchin' on to what was Passin' betwixt them two, an' they all Stopped Talkin' an' Listened. Them two, Dock Puffy an' Dock Hotty set in their Cheers with their Heads bent forward, lookin' at the Floor an' lettin' on like they wasn't Payin' no Attention, the same as two Game Cocks sets an' Pecks at the Ground between Rounds. Then when Nobody wasn't hardly Breathin' Dock Measley Spoke Up reel Loud, like he was Addressing a Big Crowd of People. Says he, "My System of Practice is Different from Some. Now that I've Got Established, I don't mind tellin' how I've Succeeded, jist to Encourage the Young Men comin' into the Perfession. It's very Simple: I don't make no Charge for Extractin' nor for Cleanin' Teeth. Nor for Irregularity Cases. Nor for Bridgework nor Plates. Nor for Fillings. My Specialty is Pickin' Out broken off Wooden Toothpicks. For that I git Two Hundred Dolers, Preachers, Widders, an' Old Maids haf Rates. Everything outside o' that is Gratis."

Everybody stopped eatin' like they'd Choked Suddenly, when Dock Measley said that. You could of Heered a Nail drop. After a Long Spell, it seemed to me, Dock Puffy, he Looked Over to where Dock Hotty was a-settin', an' I thought he Smiled a Little. Presently he Went Over an' he Laid his Hand on Dock Hotty's shoulder. I Seen for Sure he Smiled jist the Teentiest Bit now; though he was makin' a Herculaneum Effort (like our Teacher ust to say)

to keep Sober. But Dock Hotty he looked Offul Grum, like he hadn't no idea of Smilin'. So Dock Puffy he Leaned Over an' Whispered in his Ear. I was Clost enough to hear part. Said he, "Hotty, it ain't no Use; a New Star has Rose above the Horizon. Me an' you is back numbers; don't you Understand?"

Dock Hotty he Listened Clost, an' it seemed like he suddenly Ketched On. His Mouth give a Little Quirk, like he had a Mind to Laff, only he was Too Proud. So then Dock Puffy he got both their Hats, an' he Pulled Dock Hotty out of his Cheer an' faced him towards the Door, an' locked arms with him, an' then them two Went Around the Circle of the Other Dentists, holdin' their Heads bent Down an' Walkin' Slow an' Soft with their Hats agin their Breasts, lookin' Offul Solemn, like they'd jist Went Up to take the Last look at the Corpse. An' when they Reached the Door they Went Out, without sayin' Good Night, nor Nothin.

Cincinnati.

FRANK W. SAGE.

CANCERUM ORIS.—W. S. Bainbridge reports the case of two patients at Randall's Island. In the first, half of the body of upper jaw on either side was removed, the under surface of the lip was curetted and the denuded areas were cauterized with pure nitric acid. The after-treatment consisted of douching with peroxid of hydrogen followed by a saturated solution of boric acid. Fluid diet, strychnin and whisky were given. A second operation was necessary, but in spite of it the gangrene spread and the child died. In the second case the disease was treated at an earlier period; the intermaxillary bone with its teeth was removed and the superior maxilla on both sides gnawed away by a rongeur. The child is seemingly perfectly well. The upper jaw is largely filled in, the only evidence of any previous trouble being the absence of upper teeth.—*Archives of Pediatrics*.

SYPHILITIC NECROSIS OF THE HARD PALATE.—Dr. Lieven distinguishes on the roof of the mouth a primary gumma and a secondary form due to extension from the nose. Both affect the region of the raphe on the roof of the mouth. The second form is the more important, as it almost without exception causes perforation, while by the other, originating on the roof of the mouth, only a lamella of bone is separated. For the removal of sequestra which are firmly adherent he bores into the bone and loosens it with a hook. By shaking twice daily demarcation occurs in from eight to fourteen days, and it can then be removed. He cautions against the too early use of an artificial plate, as this after a short time does not fit, owing to cicatricial contraction. He advises the application of a plug of cotton-wool to overcome the discomfort; two months after the resulting cicatrization a plate can be made, and six months later operative closure, provided there has been without specific treatment no relapse in this time.

The Dental Digest.

PUBLISHED THE FIFTEENTH DAY OF EVERY MONTH

At 2231 Pralrie Avenue, Chicago,

Where All Communications Should be Addressed.

Editorial.

THE CROWN COMPANY'S FIRST VICTORY A HOLLOW ONE.

The profession is no doubt aware, through the newspaper advertisements and notices of the International Tooth Crown Company, that a verdict was recently rendered against a member of the Dental Protective Association by a jury after a six day's trial at New York. This verdict calls for some explanation, but we desire to say that it is of no controlling moment or consequence to the Association and must have no influence upon other individual suits. The Association will appeal from it and we have every confidence that it will be set aside, either in the Court of Appeals of the Second Circuit, to which the case next goes, or in the Supreme Court of the United States, to which tribunal our counsel assures us that the case can be finally taken if an adverse decision is given on the appeal.

We ask the members of the Association to remember that we have been fighting the Crown Company continuously in the courts for more than fourteen years, that during that time hundreds of claims have been made against members by the Crown Company for money for infringement of their patents, that nearly one hundred suits have been defended during that period by the Association in the federal courts in all parts of the United States, that during these fourteen years the Association has been successful in defending every previous suit brought by the Crown Company, and that no member of the Association during that time has paid one dollar to the Crown Company with the knowledge or assent of the Association. As you know, we have never tried these cases in the newspapers or journals, no do we intend to do so in the present instance. In the past we have asked the members to rest content upon our assurance that in the final trial of all cases the Association would triumph, and we ask the same thing now. Let no member of the Association contribute one dollar to the Crown Company in any

settlement, even if that organization threatens to and does bring hundreds of suits against our members for if such a foolish policy is followed by that Company every suit will be met, as the Association will defend every member who is sued.

We do not believe that the partial victory of the Crown Company in the recent suit will ever happen again to any member. The case itself was peculiar and an unfortunate one for the Association to defend. Furthermore, we do not believe that any judgment will ever be rendered again by a jury against an individual member of the Association. What effect this verdict will have upon the thousands of dentists who are not members of the Association we do not feel called upon to discuss. We believe that the Company will not relish further contests with the Association. That the Crown Company and its counsel were highly dissatisfied with the verdict appears from the fact that a strenuous effort was made by them to have the amount of the judgment, \$437, increased by the Court, but the attempt was without success.

SMYSER AND FLYNN INDICTED.

The October Grand Jury, meeting in Chicago, returned a great many indictments, and among them seven which are of especial interest to the dental profession. The readers of the *DIGEST*, having seen the editorials in our August, September and October issues, are familiar with this scandal in the former Illinois State Boards of Dental Examiners, so we will not repeat. The first indictment was against Jacob H. Smyser, ex-secretary of the late State Board of Dental Examiners, for forgery of authentic matter of a public nature. The second indictment was of Smyser for bribery in connection with the Igney license. The third indictment was against Smyser for bribery by Christopher S. Ferner. The bribery consisted in purchasing the silence and inactivity of Smyser as a member of the Board not to interfere with Ferner's practice of dentistry, he not being entitled to a license nor to practice under the law. The fourth indictment was against Smyser for selling a license to Harry N. Messenger, who was not entitled to same. The fifth indictment was of Smyser and Edward Flynn for conspiracy to do an unlawful act, namely, to defraud the body politic in selling a license to practice dentistry to a person not entitled to a license nor to practice dentistry, to wit, to Harry N. Messenger. The sixth indictment

was against Smyser and Flynn to do an unlawful act in selling a license to Oscar C. Igney. The seventh indictment was of Smyser and Flynn for conspiracy in taking money unlawfully from Ferner.

A great mass of important matter is now occupying the attention of the Criminal Court, but we have the promise of the States Attorney's office that the trial of these two men on these indictments will be taken up in the near future. We are not ready at this time to give any definite information of what has been accomplished along the line of ferreting out and putting a stop to the traffic in bogus diplomas. Your editor and his attorney are actively at work on this matter, however, and we will keep our readers informed each month of the progress made.

Notices.

OHIO STATE DENTAL SOCIETY.

The thirty-sixth annual meeting of the Ohio State Dental Society will be held at the Great Southern Hotel, Columbus, Dec. 3-5, 1901.

S. D. RUGGLES, Secy.

NORTHEASTERN DENTAL ASSOCIATION.

The annual meeting of the Northeastern Dental Association was held at Springfield, Mass., Oct. 30-Nov. 1, 1901. Officers were elected as follows: Pres., C. F. Bliven; 1st V.-P., E. B. Griffith; 2d V.-P., John F. Dowsley; Secy., E. O. Kinsman; Asst. Secy., C. F. Krappel; Treas., J. Tenney Barker; Librarian, Chas. H. Riggs; Editor, D. W. Johnston.

COLORADO STATE BOARD OF DENTAL EXAMINERS.

This board will meet at Denver, Dec. 3, 1901, at 9 a. m., for examination of applicants for license to practice dentistry in Colorado. In addition to written and oral examinations, applicants must supply their own patients, instruments and materials, and come prepared to do practical work under the supervision of the board, which will select the cavities to be filled. All applications must be completed prior to Dec. 3. For application blanks and information, address H. F. HOFFMAN, Secy., California Bldg., Denver.

VERMONT STATE BOARD OF DENTAL EXAMINERS.

A meeting of this board will be held at the Pavilion Hotel, Montpelier, Dec. 11, 1901, at 2 p. m., for the examination of candidates to practice dentistry. The examination will be in writing, and will include anatomy, physiology, bacteriology, chemistry, metallurgy, pathology, therapeutics, surgery, materia medica, anesthesia, operative and prosthetic dentistry, and an operation in the mouth. Candidates must come prepared with instru-

ments, rubber dam and gold. Applications, together with the fee (\$10) must be filed with the secretary on or before Dec. 1.

G. F. CHENEY, Secy., St. Johnsbury.

INSTITUTE OF DENTAL PEDAGOGICS.

The ninth annual meeting of this organization will convene Dec. 31, 1901, and continue for three days. The usual holiday rates can generally be obtained. This is the only normal school existing in the dental profession. A partial program is submitted—President's Address, by G. E. Hunt; Conduct of Operative Clinic, by G. V. Black (A method of keeping records, grades, etc.); Executive Work of the Faculty (Symposium), by Drs. Kirk, Patterson, Stubblefield and Hart; Metallurgy—How to Teach, by Dr. Hodgen; Class Room Methods of Teaching (A Symposium), by Drs. Hoff, Nones, Tenney and Foster; Teaching of Prosthetic Dentistry, by G. H. Wilson; Bacteriology—How to Teach, by W. R. Blue; Report of Committees on Operative and Prosthetic Technics, by Drs. Weeks and Hoff.

D. M. CATTELL, Chairman Exec. Board, Chicago.

IN MEMORIAM, ZACHARY T. SAILER, D.D.S., DIED JUNE 16, 1901.

WHEREAS, We have learned of the death of our esteemed fellow member and treasurer, Dr. Zachary T. Sailer, who was for many years one of the most earnest and active members of the Alumni Association of the New York College of Dentistry, and

WHEREAS, We feel that in the demise of Dr. Sailer our Association has sustained a serious loss and a place has been made vacant that it will be hard to fill; that we have been deprived of an able adviser and staunch friend, a man of sterling integrity and professional worth, therefore be it

Resolved, That we do hereby express profound sorrow and regret at the seemingly untimely removal of our respected brother. We shall miss his kindly presence, his able advice and royal service, and his memory will ever be held in tender regard.

Resolved, That we extend to the widow and daughter of Dr. Sailer our sympathy in their bereavement, and that these resolutions be spread in full upon the minute-book, and a copy suitably engrossed presented to his family.

JOHN HART, President,	BENJ. F. LUCKEY,	} Committee.
J. OSTRAM TAYLOR, Sec'y.	CHAS. A. DUBOIS,	
	BENJAMIN C. NASH, Chairman.	

RESOLUTIONS OF RESPECT ON THE DEATH OF DR. C. S. INGLIS.

It is with much regret and sorrow that your executive committee, in making its report to you at this the first of our fall meetings, should find it necessary to record the death of one of the members of this Society, in the person of the late Dr. Charles S. Inglis, of Paterson. In consequence of this sad bereavement we would offer the following resolutions:

WHEREAS, It has pleased Almighty God, in His wise providence, to remove

from our midst our beloved associate and fellow member of this The Central Dental Association of Northern New Jersey; be it

Resolved, That we, the members of this Society, do hereby publicly express our sympathy to the bereaved widow and loving helpmate of the deceased; and be it also

Resolved, That we lament our loss, since by the death of Dr. Inglis we have personally lost a very dear friend and associate, and the society one of its most promising and useful members; the state one of her favored sons, a professional man of rare attainments, dignified, discreet, brilliant and attractive, and therefore be it further

Resolved, That the above preamble and resolutions be embodied in the minutes of this Society, that a copy be transmitted to the widow, and that a copy be printed in the Paterson newspapers.

Signed

FRANK L. HINDLE, Chairman.

P. G. VOEGTLEN,

J. S. VINSON,

F. EDSALL RILEY,

WM. E. TRUEX,

Oct. 19, 1901.

Executive Committee.

News Summary.

J. L. NORTHROP, a dentist at Albion, N. Y., died Oct. 15, 1901.

F. A. WEAVER, 42 years old, a dentist at Boston, died Oct. 7, 1901.

AMOS EVANS, a dentist at Hillsboro, O., died of heart failure Oct. 8, 1901.

A. G. NYE, 84 years old, a dentist at Weymouth, Mass., died Oct. 7, 1901.

N. N. HAYS, 52 years old, a dentist at Jackson, Tenn., died Oct. 25, 1901.

EDWIN ROOT, a dentist at Northville, Mich., died suddenly of heart disease Nov. 8, 1901.

THOMAS L. BROWN, said to be the oldest dentist in Illinois, died at Taylorsville, Nov. 2, 1901.

T. A. LONG, 40 years old, a salesman for the S. S. White Co., died at Oxford, Md., Nov. 5, 1901.

L. L. HOWELL, a dentist at East Hampton, N. Y., 45 years old, has been missing for the past three months.

DANGER AHEAD.—Hewitt: "I have been threatened with appendicitis." Jewett: "Who threatened you—the doctor?"

PUGILISM AND DENTISTRY.—The difference between a pugilist and a dentist is, the latter pulls teeth while the former knocks them out.

CARL KLEIN, SR., a dentist in Chicago, died Oct. 15, 1901, from dropsy. He was succeeded in practice by his son, Carl Klein, Jr., in 1896.

GOOD WORK OR NO PAY.—The county court at Denver has decided that a dentist who fails to do satisfactory work is not entitled to any remuneration for same.

A. S. DABNEY, 40 years of age, a dentist at Paducah, Ky., has been ill for some time from typhoid fever, and at time of our going to press is not expected to live.

E. T. WHITE, a dentist at Cambridge, Mass., while riding a bicycle in Boston last month was run into by a truck and received injuries which may cost him his life.

TEXAS DENTAL EXAMINERS.—On Oct. 5, 1901, the governor reappointed C. C. Weaver, T. L. Westerfield and M. S. Merchant members of the state board of dental examiners.

SAD BUT TRUE —Sillicus: "It's a beautiful thing to see a young girl growing into womanhood." Cynicus: "That's right. So many of them seem to want to grow into manhood."

TOLEDO (OHIO) DENTAL SOCIETY held its annual meeting and banquet Nov. 9, 1901, and elected the following officers: Pres., W. S. Graves; V.-P., A. J. Wolfert; Sec. and Treas., E. D. Gardner.

CHARLES F. DEITZ, 22 years old, a dentist at Williamsport, Pa., had been missing since Sept. 26, 1901, and his body was recently found in a river near the town. He was probably accidentally drowned.

SATAN A DENTIST.—A woman in Cincinnati recently complained to the police that Satan had turned dentist and extracted her teeth, so the authorities put her where she would not again be bothered.

SPRINGFIELD (ILL.) DENTAL SOCIETY held its annual meeting Nov. 7, 1901, and elected the following officers: Pres., B. M. Smith; V.-P., George B. Weakley; Secy., J. B. Watts; Treas., T. P. Donelan.

SAGINAW VALLEY (MICH.) DENTAL ASSOCIATION met last month at Bay City and elected the following officers: Pres., Irwin Myers; V.-P., S. Straith; Secy., W. C. Purmort; Treas., W. F. Alton.

CEDAR RAPIDS (IOWA) DENTAL SOCIETY held its annual meeting Oct. 17, 1901, and elected the following officers: Pres., L. E. Richardson; V.-P., C. G. Booth; Secy., J. H. Calder; Treas., W. D. Patterson.

ROBBERIES.—Since our last issue two dentists in Detroit, one in Fremont, O., one in Sandusky, O., and one at Santa Cruz, Cal., have been robbed by sneak thieves who entered their offices and took gold, material and tools.

QUICKLY ENLIGHTENED.—"What seems to be the matter with him?" asked the doctor, approaching the bedside of the man who lay swathed in bandages. "He found out where the gas leaked," briefly explained the nurse.

BABY HELD FOR DENTAL BILL.—A dentist in Denver recently snatched a baby out of its mother's arms, because the latter would not pay for having a tooth treated. He afterwards gave up the child, but the court fined him just the same.

NEW YORK DENTAL EXAMINERS.—The annual meeting of the New York State Board of Dental Examiners was held at Albany last month and the following officers were elected: Pres., S. B. Palmer; Secy., Frank French, Rochester; Editor, Wm. Carr.

CALIFORNIA DENTISTS MUST REGISTER.—According to a law which went into effect Sept. 1, every dentist in the state of California must register within six months of that date. In case of failure to do so his certificate is forfeited, and to renew same will cost \$25.

SOUTHWESTERN IOWA DENTAL ASSOCIATION held its annual meeting at Chariton last month and elected the following officers: Pres., H. S. Barnhart; V.-P., J. I. Tomy; Secy., W. C. Mather; Treas., G. King. The next meeting will be held at Clarinda in October, 1902.

DENTIST MAY BE TRIED FOR MURDER.—O. S. Burnett, a dentist of Chicago, was held to the grand jury last month and may be indicted on a charge of murder. He was with a married woman when she committed suicide, and he bought for her a portion of the poison which she took.

ANTIDOTE FOR COCAIN.—Gelsemium is suggested as an antidote for cocaine. It has been tried in treating patients whose dentists have injected cocaine for dental work. In a number of cases there were bad results—syncope, etc., and in every case gelsemium gave excellent results.—*Ex.*

HARTFORD (CONN.) DENTAL SOCIETY held its annual meeting Oct. 14, 1901, and elected the following officers: Pres., James McManus; V.-P., J. W. Harper; Sec., Edward Eberle; Treas., E. R. Whitford; Ex. Com., N. J. Goodwin, Chairman, G. O. McLean, E. B. Abbey; Librarian, A. E. Carey.

SOUTHERN CALIFORNIA DENTAL ASSOCIATION held its fourth annual meeting at Los Angeles, Oct. 8-9, 1901, and elected the following officers: Pres., E. G. Howard; 1st V.-P., M. E. Tabor; 2d V.-P., M. E. Jordan; Secy., L. E. Ford; Treas., J. M. White. Twenty new members joined the association.

MARRIED.—L. E. Blaine, Greenview, Ill., Oct. 24; C. L. Clarke, Syracuse, N. Y., Oct. 17; C. A. Fletcher, Baldwinville, Mass., Oct. 10; H. L. Griswold, Jacksonville, Ill., Oct. 16; H. W. Shucks, Solomon, Kas., Oct. 19; C. E. Stephenson, Jamestown, Ind., Oct. 21; D. P. Turner, Parkersburg, W. Va., October 16.

DENTISTRY FOR GUESTS.—The death of an eccentric millionaire in Connecticut recently has brought out the fact that during his lifetime he always insisted upon his guests keeping their teeth in proper condition, and if the appearance of same did not suit he called in a dentist at his own expense to do the work.

OUGHT TO BE GOOD FOR SOMETHING.—The following shows the simplicity of language used by German chemists: "If benzoynaphtylamid is treated with nitric acid in forms two isometric monitronamidobenzonaphtylamids, of which one gives mononamidobenzonaphtylamid and the other adhydrobenzodiamidonoleana."

ESSIG RESIGNS.—Dr. Charles J. Essig of Philadelphia severed his connection with the University of Pennsylvania Dental Department at the close of the last college year. The act is regretted by all the friends of the University. Dr. Essig was for several years at the head of the dental department of this school, and has always been closely identified with its growth and development.

NORTHERN ILLINOIS DENTAL SOCIETY held its fourteenth annual meeting at Joliet, Oct. 16-17, 1901, and elected the following officers for the ensuing year: Pres., C. J. Sowle; V.-P., J. E. Hancock; Secy., J. J. Reed; Treas., M. R. Harned; Ex. Com., C. J. Underwood. The next meeting will be held at Rockford in 1902.

LIBEL SUIT IN DETROIT.—Dr. Dennis Murray, a dentist in Grand Rapids, Mich., has brought a \$25,000 libel suit against H. J. Caulkins, a dental dealer of Detroit, claiming that the latter stated in a letter to the Governor that he (Murray) should never have been given a license to practice and also accused him of bribery.

DENTISTS SHORT LIVED.—The *Humanitarian* states that clergymen are the longest lived of all men, their average age at death being 68 years. The average ages in various callings in life run from 43 to 68, and the age of dentists is put at 45 years. This is attributed to the arduous, confining and perplexing character of a dentist's profession.

VIRULENCE OF THE DIPLOCOCCUS IN HUMAN SALIVA.—Efsio Murgia concludes from experimental researches that the diplococcus is most virulent in persons under ten or over forty years of age. Low atmospheric pressure and low temperature, abundant rain and dampness appear to favor the pathogenic action of this organism.—*La Rif. Med.*

HYPODERMIC NEEDLES.—Doin notes that it is not necessary to throw away hypodermic needles that have been used, for if the canal has become obstructed the needle can be made as good as new by simply boiling it for ten minutes in a solution of carbonate of soda; the precipitate which has collected on it is dissolved by this method and the primitive brilliancy is restored.—*Bul. General de Therap.*

CLINICS CAUSE TROUBLE—Several dentists of Nashville, are trying to stir up trouble for the dental colleges. They claim that the students in the colleges are practising dentistry in violation of the law, and that the clinics are run principally for revenue. The question is an interesting one and far-reaching in its results. The outcome will be watched with interest by dentists and colleges everywhere.

INTERMINABLE.—During the recent meeting of a large dental society the superintendent of a railroad was taken to one of the sessions by his brother, who was a visiting dentist. A paper and discussion was listened to and the pair then left. The dentist asked his brother's opinion of the meeting and the men, and the railroader replied, "They are all right, I guess, but they have d—d poor terminal facilities."

THIEF GAGGED BY DENTIST.—The story comes from Paris that a dentist and his wife were recently walking on the street when a young man snatched the lady's pocketbook. Her husband was unable to catch the thief, but obtained a good look at him. By a curious coincidence the thief came to the dentist's office a few days later suffering from toothache. The dentist took an impression of his mouth with plaster paris, but allowed it to fully harden, then told the thief to follow him to the police station. The man gesticu-

lated wildly, but finding that his wide-open mouth was filled with a solid block of plaster he went meekly to jail.

FORMALDEHYD ANTIDOTE—In view of the fact that this chemical is coming more and more into general use as a disinfectant and antiseptic, cases of poisoning from it will become more frequent. We have an easily accessible and reliable antidote in ammonia water. It may be given in the form of ammonia water (a few drops well diluted) or the aromatic spirit or a solution of ammonium acetate.—*Merck's Archives*.

OHIO STATE MEDICAL BOARD VICTORIOUS.—The Ohio State Board of Medical Registration has just obtained from the Supreme Court of Ohio an important decision which establishes its right to determine whether a medical college is in good standing. This was the outcome of a suit brought against the board by a medical college. The precedent thus created will strengthen the hands of medical and dental boards all over the country.

ILLEGAL PRACTITIONERS.—A young man at Sutherland, Ia., was sued for malpractice recently, and a judgment of \$500 was secured against him by default. It is claimed that he was not entitled to practice. A man at Norfolk, Va., was fined \$50 last month for practicing dentistry without a license. The dentist at West Duluth, Minn., whose case has been in the court for some time, was fined \$100 on Oct. 20 for violating the law.

DAMAGE SUITS.—A dentist at Racine, Wis., has been sued for \$1,500 by a woman who claims that he spilled carbolic acid on her face. The defendant states that the accident was unavoidable, and he will fight the suit. A man at Easton, Pa., went into a dental parlor in that town to have a tooth extracted. A quantity of gas was administered without effect and the patient tried to leave the chair. Three dentists attempted to hold him in the chair without success, although he was injured in the struggle. He is now suing for \$150 damages.

PLANK PULLS TEETH.—Last September a man in Chicago stepped off a sidewalk and fell against an upright piece of scantling. Three front teeth were driven far into the plank by the force of the fall and the man could not release them. He therefore took the scantling to a dentist, but the latter separated the teeth from the man instead of from the board. The unfortunate victim of the accident is now suing the city for \$10,000 damages, and the scantling with the three teeth sticking in it will be an important exhibit when the damage suit comes to trial.

FATALITIES.—A woman at Sioux City, Ia., died Nov. 6, from a stroke of apoplexy which came while she was having a tooth filled. A young man in Canada died last month after having some teeth extracted under an anesthetic. A woman in Utah died under chloroform last month, given while some teeth were extracted. The same thing happened to a woman at Logansport, Ind. A man in Wisconsin died Nov. 8 from blood-poisoning resulting from extraction of teeth. A man of Niagara Falls had twenty-one teeth extracted at Buffalo last month and almost died from loss of blood. The dentist also ought to have been bled.

CHANGE ADVISABLE.—A civil engineer was recently on the witness-stand for the plaintiff in a damage suit, and the lawyer for the defense tried to discredit him in the eyes of the jury. "How long have you been a civil engineer," he asked. "About eight years." "What were you before that?" "A dentist." "How did it happen that you quit the easy and lucrative practice of dentistry to become a land surveyor?" "For the same reason, I presume, Mr. Lawyer, that you quit the carpenter's trade to become a lawyer. I realized that I was a mighty poor workman."

BURGLAR CHLOROFORMED.—The story comes from Connecticut that a prominent dentist of the state got his start in the following manner: Returning to his office one evening for a book he found there a rough looking fellow with a bag in his hand. The dentist immediately insisted upon his taking a seat in the chair, giving the burglar to suppose that he thought his call was for professional services, and before the amazed malefactor could make up his mind to fight or run the dentist had him chloroformed, gagged, bound and in the police station. When the story came out people thought that a man with such nerve must be competent in his profession, so a lucrative practice followed.

BUCCAL LEUCOPLASIA is a chronic condition in which the mucous membrane of the mouth is covered with white spots, some of which are desquamating. There is generally some ulceration. The main predisposing causes are syphilis, gout, rheumatism, etc. Leucoplasia sometimes is the point of origin of carcinoma. Caustics must not be used in treating leucoplasia; nor is any local treatment generally beneficial. Diet, hygiene, relief for constipation, alkaline waters as a mouth-wash, no indulgence in smoking or in alcohol, etc., are needed in the treatment. A salicylic or chromic acid wash may do good after the affection has become chronic. Finally curetting or the thermocautery may be used to remove the leucoplasia.

COINCIDENCE.—"That tooth was awful hard to pull;

I had to yank, and strive—

But since you are my customer,

I'll charge you only five,"

Said the dentist.

"A rather strange coincidence—

Your pardon, sir, I beg—

But when you pulled my tooth, I'll swear

You also pulled my leg,"

Said the man. —*New Orleans Times-Democrat.*

SARCOMA OF INFERIOR MAXILLA, TWENTY YEARS AFTER PARTIAL RESECTION.—Dr. William T. Bull presented the patient, a woman, thirty eight years old, upon whom he had performed a partial excision of the lower jaw for giant-celled sarcoma in June, 1880, now nearly twenty-one years ago. At that time the growth had been in existence about one year. It involved the floor of the mouth and part of the jaw corresponding to the incisor and cuspid teeth of both sides, and presented the characteristic features of a central sarcoma about the size of an egg. It was removed, together with a

margin of healthy bone on each side, and the patient made an uneventful recovery. The microscope showed the growth to be a giant-celled sarcoma. Since the operation she had enjoyed perfect health. There had been considerable atrophy of the muscles of the lower jaw, of which only the part carrying the molar teeth was left behind. The chin had fallen in slightly. Dentists had been unable to fit her with a satisfactory artificial plate. There was no impairment of speech, and she was able to masticate her food fairly well with the assistance of her tongue.—*Med. Record.*

ETHER NARCOSIS.—Becker has for two years added oleum pini pumilionis to ether just before administering the anesthetic, 20 drops to 200 g. of ether, to prevent the secretion of mucus. This gives but a slight piny odor to the ether, making it less objectionable to the patient. Becker has used this mixture in about 500 cases, with uniform success. Even when bronchitis, phthisis, empyema, or senile emphysema existed these conditions have not grown worse. In one case, a goiter in a woman of 58, mucus collected in the bronchi, lasting a few days. Since the oil of turpentin cannot do harm its effect is even better than atropin, which is so often given before operation to prevent the accumulation of mucus.—*Centrablatt f. Chirurgie.*

TRUTHFUL.—Patient: "You idiot! Didn't you tell me the pain would be all



over in a second?" Dentist: "Well, don't you feel the pain all over you?"—*Harpers Bazaar.*

INTERRUPTED ETHER NARCOSIS.—Kronacher believes that most of the unpleasant after-effects of ether anesthesia are due to the amount of drug employed and the length of time the patient is kept unconscious. Major anesthesia is usually employed for many small operations which do not really demand it, and the author describes a method which makes painless operating possible with a minimum amount of the anesthetic. One or two drams of ether are poured into the inhaler and several deep breaths taken. The same quantity of ether is again added and the anesthetization continued till the stage of excitement begins. The operation in most cases can now be done without any further administration of anesthetic, though rarely a third addition of 3 ii.-iii. is necessary. The duration of such a narcosis is about ten minutes, and while the patients are not unconscious and often cry

out, all memory of pain is effaced on awaking. This method obviates ether pneumonias and does away with the usual headache and nausea.—*Med. Record*.

PERNICIOUS ANEMIA WITH SYMPTOMS OF SPINAL DISEASE.—Dr. Thomas McCrae exhibited two cases, both males. One a laborer, aged 38, dates his sickness from December, 1898. He was able to work until March, 1900. Just before the latter date he suffered from a carbuncle and now complains of stiffness and numbness in his arms and legs. Knee-jerk is exaggerated. There is no complaint of the anemia, although hemoglobin is 50 per cent and red corpuscles 2,500,000. The second was an elderly man, whose sickness began eighteen months ago, when he fell down stairs and afterwards could not work. He complains of numbness of the limbs and holds himself stiffly, walking with stiffness and difficulty. The knee-jerks were elicited only with difficulty. Hemoglobin was 73 per cent and red corpuscles 3,500,000. Both patients are taking arsenic, and the first has very bad teeth, of significance in view of the recent investigations of Hunter, who believes that caries of the teeth bears an etiologic relationship to the disease.—*Jour. A. M. A.*

DETERMINATION OF DEATH BY X-RAYS.—The subject of the definite determination of death is one of great importance, and new tests are from time to time submitted. The latest one, as we learn from the *American X-Ray Journal*, which quotes the passage without, however, stating its authority, is that of Professor Ottolenghi, of the University of Siena. The professor is said to have "discovered that, while it is easy to apply the rays to the lungs of a person who is alive or in trance, it is extremely difficult, indeed practically impossible to apply them to the lungs of a person actually dead." The reason is that some intervening obstacle prevents the rays from penetrating into the body. He has repeatedly made a test of this kind, always with the same result. Professor Ottolenghi therefore suggests that, as this test can easily be made by any physician, it should in future be employed in all cases where there exists doubt of death. It seems to us that the value of this test could be easily settled by experiment and that its further investigation is desirable.—*N. Y. Med. Jour.*

ENLARGEMENT OF SUBLINGUAL VEINS IN INFANTILE MYXEDEMA.—Recently I observed in a case of sporadic cretinism, or infantile myxedema, a condition which, to my knowledge, has not been described; namely, a marked dilatation of the veins on the under surface of the tongue, amounting, in fact, to true varicosities, particularly when the infant would cry. It seems to me that this condition is but the result of pressure excited by the hypertrophic tongue, thus rendering the return circulation very inactive. So great did the dilatation appear at the crying periods that one could not fail to be impressed with the safety in this case of delayed dentition. It can easily be imagined that during a severe paroxysm such a tense and dilated vein might be ruptured by a sharp incision. Though not of great practical importance, it is a fact which appears to me worthy of clinical note. I might add that, since the infant has been medicated with increasing doses of

thyroid extract, this venous dilatation has gradually subsided, and there has been improvement of the general condition and diminution in the size of the tongue. Jacob Sobel, M. D.—*Med. Rec.*

OPIUM POISONING.—J. A. Henton White reports the case of a baby of three months, who was brought to him very pale and cold, the pupils minutely contracted, and in a stupid condition, from which it could be roused only with difficulty. The mother had put a pledget of cotton-wool, soaked in laudanum, in her tooth which was aching, and had then moistened the nipple of the baby's bottle several times in her mouth. The baby's stomach was washed out with very weak Condy's fluid, and a drop of liquid extract of belladonna was left in. The child was also given a small enema of black coffee, and it was roused and kept awake. The child showed the effects of the belladonna, and was given a warm bath. The next day it was quite well.—*Brit. Med. Jour.*

LOCAL AURAL, NASAL, AND BUCCAL ANESTHESIA.—A. A. Gray (*Lancet*) states that as a means of avoiding cocain intoxication, of deepening and prolonging the anesthesia and of facilitating general operative rapidity and convenience, he has found the following procedure very useful: A 20 per cent solution of cocain hydrochlorate is made in rectified spirit and a 20 per cent suspension of beta eucain in anilin oil. In the latter about one-half of the eucain settles to the bottom, necessitating shaking well before using. After preparing the field for application ten drops of each solution are taken, mixed and well shaken. The resulting turbid, milky solution soon clears up, and contains 10 per cent each of cocain and beta-eucain and 50 per cent each of rectified spirit and anilin. In the nose the mixture is applied on a pledget of cotton and rubbed in as well. In the ear a few drops may be instilled into the canal, or better, gauze soaked in it may be placed over the field through a speculum. In the mouth and pharynx the rubbing or painting on is all that is necessary. There are two difficulties: first, in the nose, the solution at first burns considerably; second, in children, the dose must be modified. A good rule is to use a total of twenty drops of the mixture for adults and in proportion of that amount for children. Its acme of activity is present within about seven minutes.—*Medical News.*

ANESTHESIA PARALYSIS.—The paralysis which is observed after operations and credited to the anesthetic or conditions during anesthesia is noticed and a case, which Brickner claims to be the fifth in the literature, reported. While none of the views as to the causation of the condition seem entirely satisfactory to him, the traumatic element is evident and he deduces the following conclusions: 1. The care of the arms is as important a part of the anesthetist's duty as is the administration of the narcotic. They should never be allowed to hang over the edge of the table. This position threatens the musculo-spiral nerves by pressure and the entire plexus by stretching. 2. Rotation and superextension of the head should be exercised only while emergency requires it. 3. Prolonged pressure of any kind should be avoided, be it that of an assistant's hand or body, or that of a harness. When used, the shoulder-strap of a leg-holder should pass over the tip of the shoulder,

or over a large pad of cotton-wool on the neck; or, best of all, should be held by an assistant—the anesthetist can usually spare a hand to pull the strap up from the body from time to time. It should be remembered that this apparatus has occasionally caused paralysis in a leg, as in one of Garigue's cases. 4. The common practice of drawing the arms alongside the head, however much it may contribute to the convenience of the anesthetist and the comfort of the operator, is a bad one and should not be tolerated. Remembering that in some of the cases reported (25) the arms were lying alongside the body during the operation, the safest rule to follow is to avoid allowing either arm to remain for more than a few minutes in any one position, however innocent that position may appear to be.—*N. Y. Med. Jour.*

DEATH THROUGH CHRISTIAN SCIENCE NEGLIGENCE occurred in Toronto within the past two weeks; and as an evidence of the healthy state of the public mind toward the peculiar doctrines of these people, the coroner's jury returned a verdict worthy of more than an ordinary notice: "That the said—boy—came to his death on Tuesday, August 13th, from diphtheria, and we find that . . . the father of the deceased showed culpable criminal negligence in not providing medical assistance, medicine, nursing and comforts, and that . . . the Christian Science demonstrator was an accessory after the fact, inasmuch as he undertook to advise and treat a dangerous contagious disease, which he admitted he was totally ignorant of. The teaching of the sect known as the Christian Scientists, as brought out in the evidence is a danger to the community, and the jury would recommend that the law should make it a criminal offence for a demonstrator of this peculiar sect to attend or treat a case which is not being attended by a duly qualified practitioner.—*Phila. Med. Jour.*

CONGENITAL MEDIAL FISSURE OF THE UPPER PORTION OF THE FACE.—The following extraordinary case was observed in the year 1900 by Dr. Lehmann-Nitsche. The subject, a man of 18 years, who has been several times in the hands of the police, and who is at present serving a sentence in prison, was born in Italy and then taken to Argentina. The deformity existed at birth. His parents were peasants normally formed. He was the third of twelve children of whom four others are alive and healthy, and none of those that died were in any way deformed. The patient has a cleft that involves the frontal bone and the nose, giving rise to an abnormal breadth of the forehead, and a deep depression between the two portions of the nose, causing separation of the eyes. The space between this cleft has probably in the course of time been filled by bone, which can be plainly felt beneath the skin. Binocular vision is impossible, but the eyes are apparently entirely normal with the exception of a slight impairment of vision on the right side. The nasal septum is on the left side, and the left nasal fossa is larger than the right. There is no separation between the two superior maxillary bones, but a distinct groove can be felt where they are united. The mouth is normal in formation. Two of the incisors are only rudimentary in the upper jaw. Otherwise the patient is normal. His intelligence is only moderate. An operation is not under consideration.

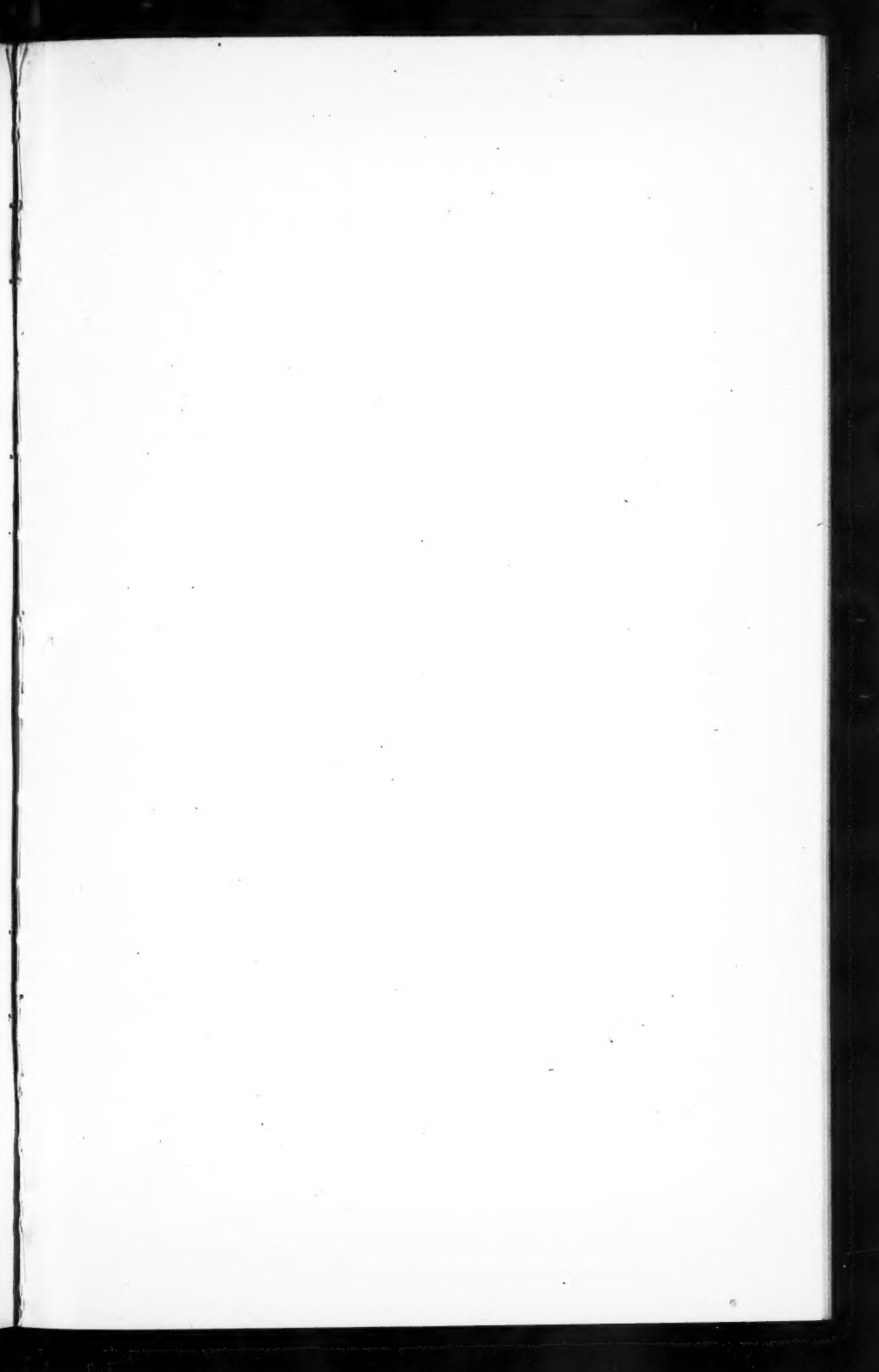
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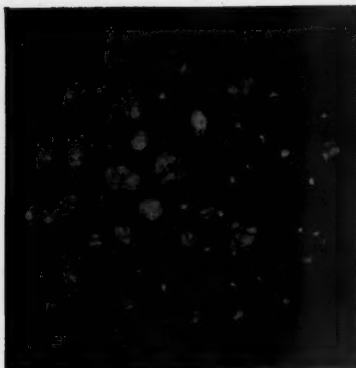


FIG. 2.—Bodies removed from so-called dentigerous cyst (reduced in size one-third).

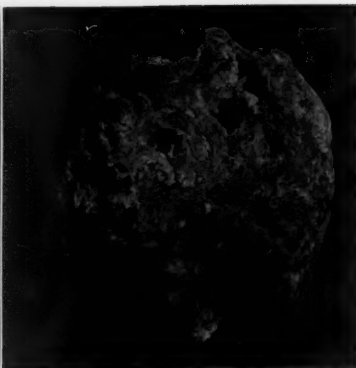


FIG. 6.—Large oval Odontome (magnified $2\frac{1}{4} \times$).

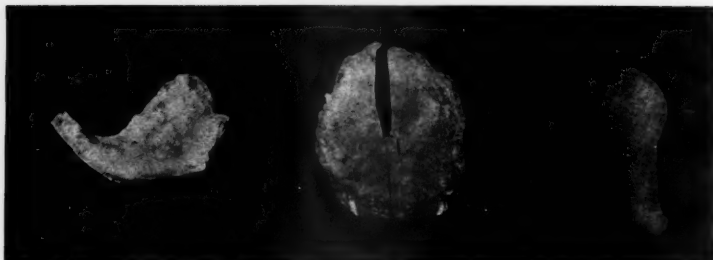


FIG. 1.—Tumor on cuspid tooth (actual size).

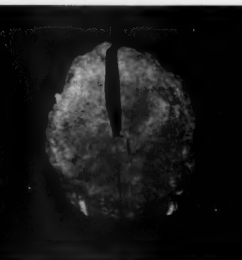


FIG. 7.—Dr. Black's Odontome, from which the photomicrographs were obtained (magnified about $1\frac{1}{4} \times$).



FIG. 5.—One of the diminutive teeth from Fig. 3 (enlarged six times actual size).

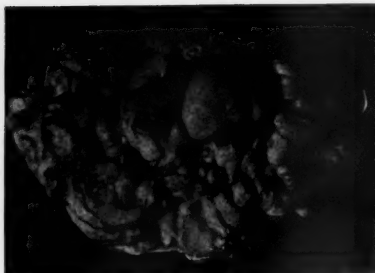


FIG. 3.—Oblong Odontome, composed largely of diminutive teeth (magnified $2 \times$).

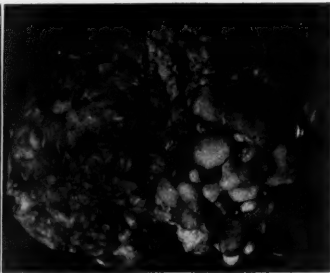


FIG. 4.—Opposite side of Odontome shown in Fig. 3. (magnified $2 \times$).

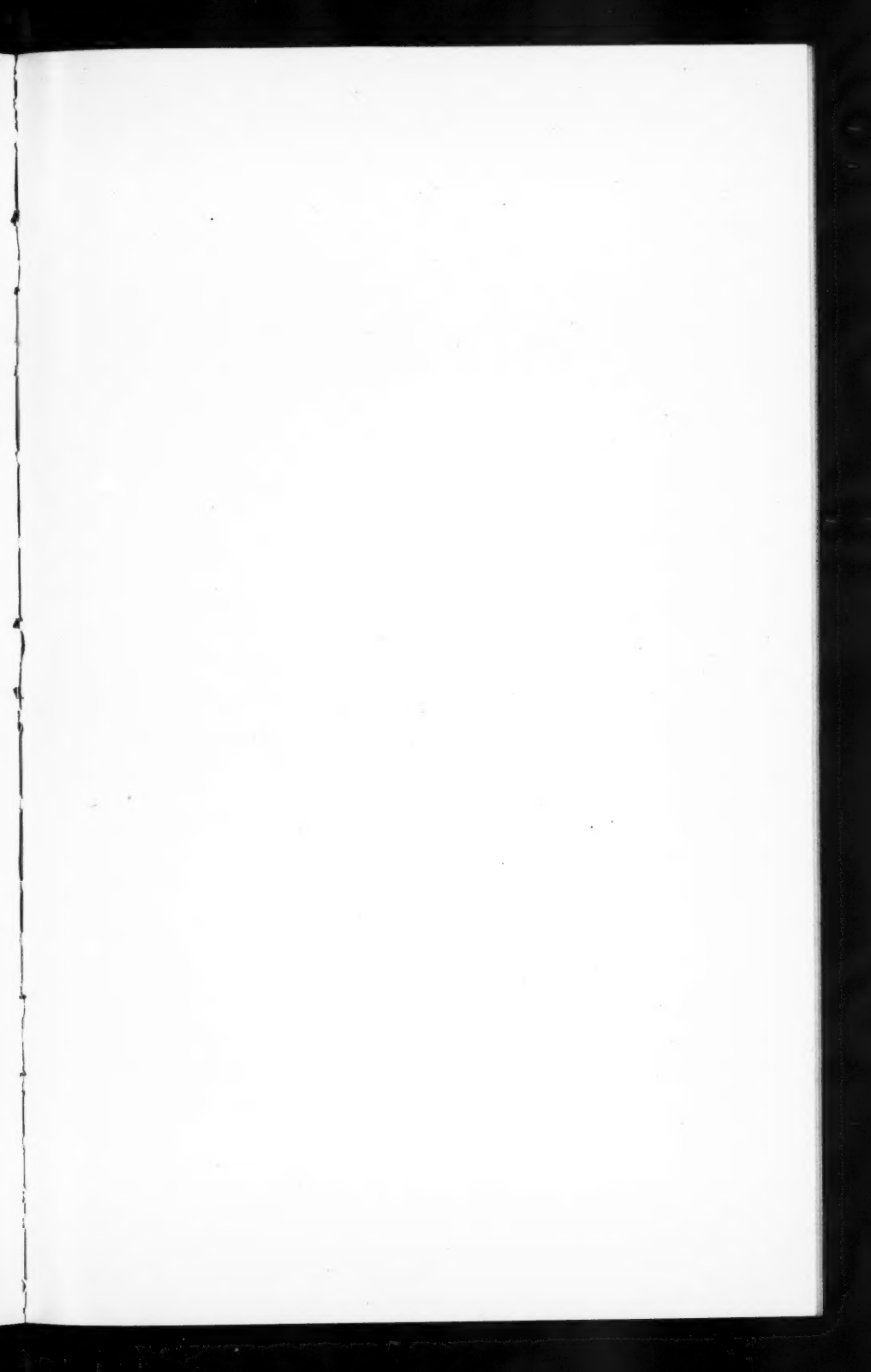




FIG. 8.—A. A. Zeiss, Obj. About 85 X (reduced one-half). Ground section from Odontome, Fig. 7.
E—Enamel in the form of little caps. D—Dentin. D'—Dentin, showing interglobular spaces. C—Irregular calcific material of the nature of imperfect cementum.

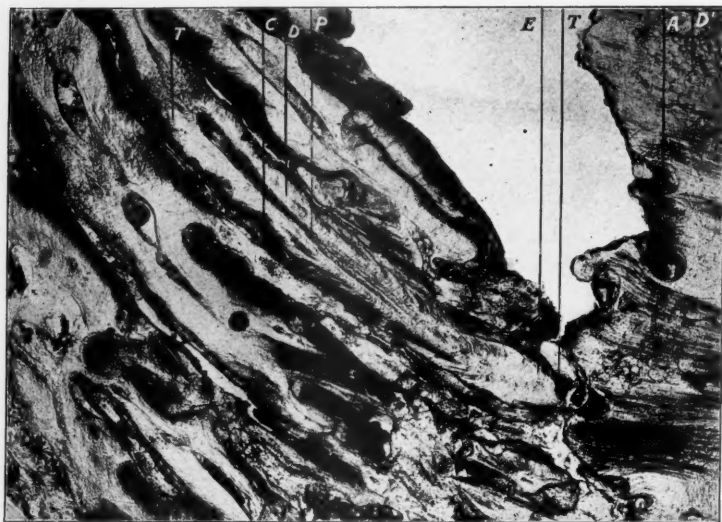
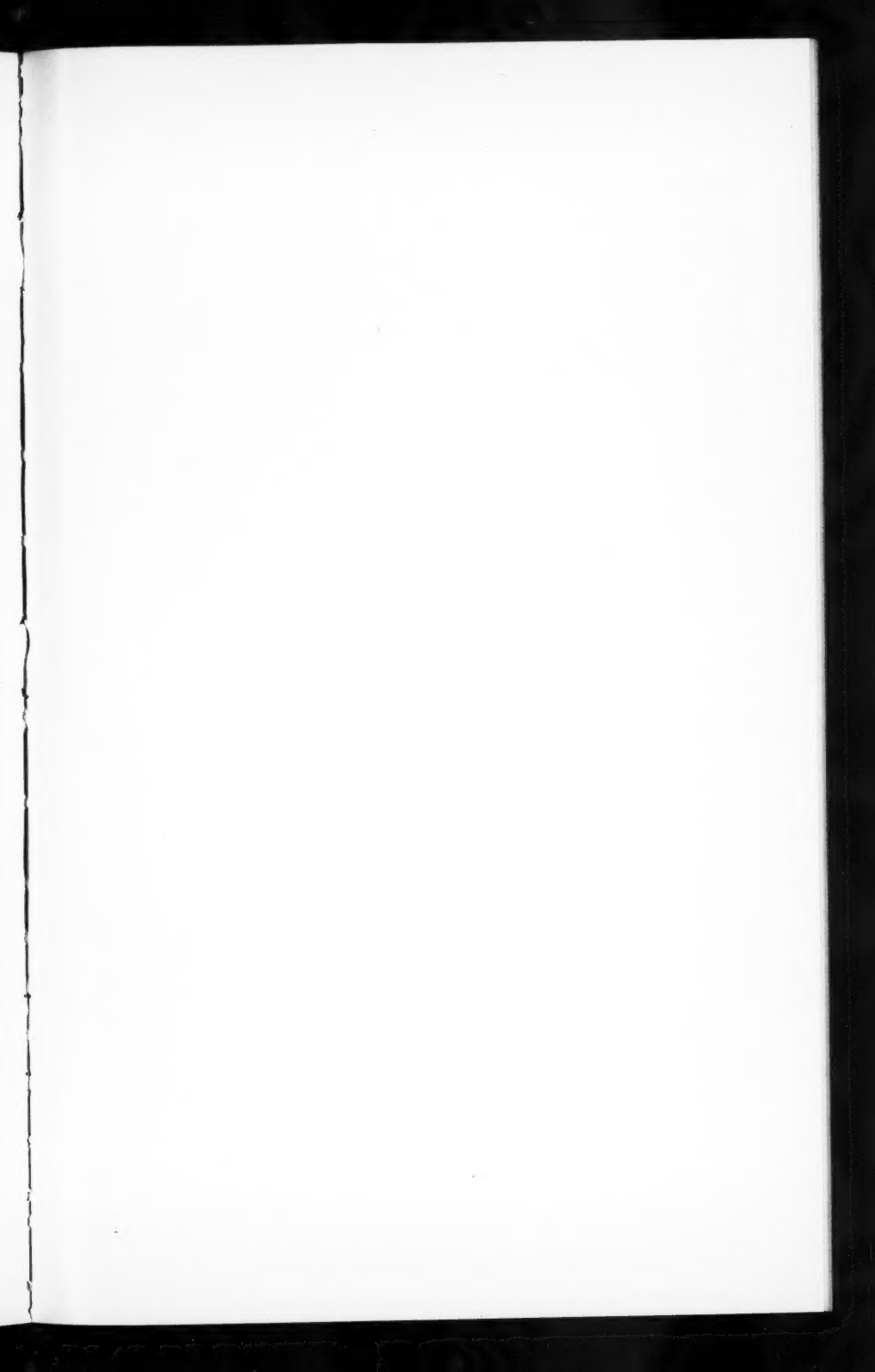


FIG. 9.—35. M. M. Zeiss, Obj. About 42 X (reduced about one-half). Ground section from Odontome, Fig. 7 (reduced to about one-quarter).
T—Little tooth or denticle. D—Dentin. D'—Dentin, showing interglobular spaces. A—Absorption areas. E—Enamel cap. P—Pulp chamber. C—Cementum or irregular calcific material between denticles.

Photographs and Photomicrographs by Dr. F. B. Noyes.



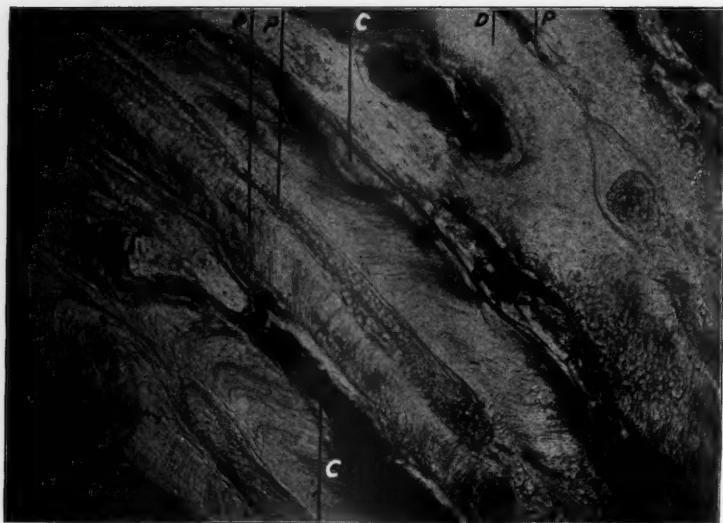


FIG. 10.—A. A. Zeiss, Obj. About 85 X (reduced about one-half). Ground section from Odontome, Fig. 7.

P—Pulp canals containing calcific material. D—Dentin. C—Cementum, or very irregular calcific material between denticles.

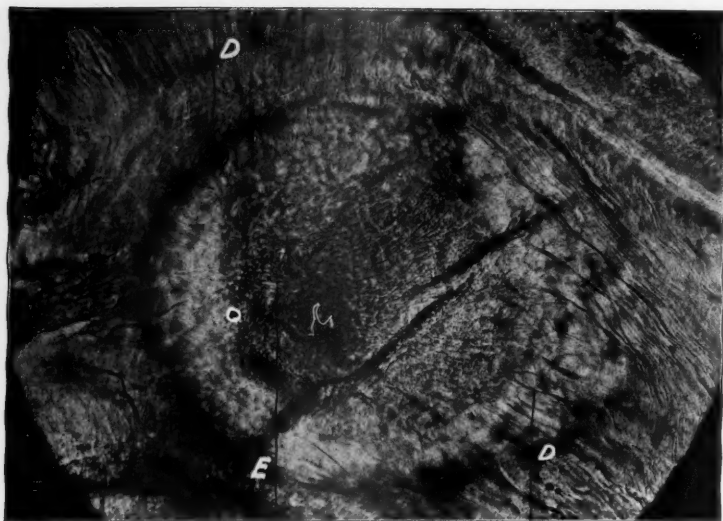


FIG. 11.—D. D. Zeiss, Obj. Occ. No. 2. About 500 X (reduced about one-third). Ground section from Odontome, Fig. 7.

E—Enamel. D—Dentin, showing characteristic forking of tubules next to enamel.

Photographs and Photomicrographs by Dr. F. B. Noyes.